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THE UNIVERSITY OF ALBERTA

THE DISTRIBUTION OF ETHNIC GROUPS IN ALBERTA, CANADA,
ACCORDING TO THE 1961 CENSUS

by

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A THESIS

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THE UNIVERSITY OF ALBERTA
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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled The Distribution of Ethnic Groups in Alberta, Canada, According to the 1961 Census, submitted by Hugo L. P. Stibbe in partial fulfilment of the requirements for the degree of Master of Science.

ABSTRACT

This study presents an original series of eleven dot maps depicting the distribution of the ethnic groups of Alberta based on the 1961 Census. In order to describe the distributions shown on the maps, two quantitative measures are used. One, the Index of Concentration, provides a numerical expression of the degree of concentration or dispersal of each ethnic group throughout the province. The other, the Index of Areal Segregation, is a numerical expression of the comparative degree of clustering shown by each ethnic group.

The study concludes; (1) areal association or segregation of the ethnic groups can be evaluated in numerical terms on the basis of the quantitative criteria used in the study; (2) cultural ties among individual members of some of the ethnic groups have been strong enough to influence and give character to their distribution patterns; (3) the distribution characteristics of the ethnic groups can be classified numerically on the basis of one of the quantitative criteria developed in the study, namely, the Index of Areal Segregation; and (4) the Index of Areal Segregation can be used as a measure of the degree to which social integration of ethnic groups has taken place.

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CHAPTER I

INTRODUCTION

The North American continent has been settled by people of predominantly European origin. The cultural backgrounds of these people are many. Alberta, with a relatively recent settlement history, constitutes an ideal area for studying the effects of the interactions of people with many different kinds of cultural backgrounds, brought together in a free society where the interactions between the different people could take place with the least amount of interference. To what extent the interactions between the various existing ethnic groups in Alberta have affected their distribution patterns will be the central question with which the study is concerned.

The author became interested in this problem during the summer of 1965, when he was asked by the Atlas of Alberta to produce a series of maps which would show the ethnic distribution in Alberta according to the 1961 Census. While working on this project, the author's interest about certain aspects of the distribution of the ethnic groups in Alberta was aroused.

The study is in essence a population distribution study, which attempts to describe and define the character-

istics of the distribution of the ethnic groups, and how the distribution patterns are related to each other. Such a study has to explore to some extent the question of what constitutes an ethnic group, in order to account for the characteristics of the distribution patterns of particular groups. It has to be emphasized, however, that the study is not intended to explore the social or cultural aspects of ethnic groups in any depth, since this falls outside the scope of a study which proposes to examine a population distribution.

Scope of the Study and Background to the Problem

The great complexity of causal factors which may influence a population distribution has made it very difficult to find the proper criteria for recognizing the character of the ethnic population distribution in Alberta.

One condition which the choice of criteria must satisfy is that it must enable one to recognize the possible differences or similarities which may occur from place to place in the study area, together with their spatial associations. A second condition which must be met in the choice of criteria is that it must enable one to recognize the possible relationships among the phenomena. Three criteria used in the study are as follows:

1. A cartographic criterion consisting of a series of twelve maps, showing the distribution of the population by ethnic group. They enable one to study visually each ethnic group distribution, and to compare visually the distribution patterns of the ethnic groups with each other.

2. A quantitative criterion, expressing numerically the relationship between area and ethnic population distribution.
3. A quantitative criterion, expressing numerically the relationship among the different ethnic groups.

The study has been approached within the context of these three criteria alone. Because the emphasis in this study is primarily cartographic, social and cultural criteria of the ethnic groups have not been widely used, except in those cases where necessary to clarify the distribution patterns.

The original contribution of the study lies for the greater part in the map series showing the distribution of ethnic groups in Alberta according to the 1961 Census, and in the attempted classification of these distributions.

The Statistics and their Limitations

For the purpose of mapping the distribution of the ethnic groups in Alberta, unpublished 1961 Census data were used. Any statistical data referred to in subsequent chapters, without mention of the date of the Census from which they were derived, are derived from the 1961 Census. The unpublished 1961 Census data were obtained from the Dominion Bureau of Statistics in Ottawa by Mr. D. I. Istvanffy, the Director of the Alberta Bureau of Statistics, on behalf of the Atlas of Alberta.

The detailed statistics, showing the "Population of Alberta by Ethnic Group and by Enumeration Area", made it possible to map the distributions with the accuracy and detail shown. The methods of construction of the map series will be discussed in Chapter II.

Of some concern here is the definition used by the Canada Census for the term "Ethnic Group". The 1961 Census Enumeration Manual instructs the enumerator to ask each person the following question:

"To what ethnic or cultural group did you or your ancestor (on the male¹ side) belong on coming to this continent?"

Further clarification on the question to be asked by the enumerator gives us an idea of what the Canadian Census understands by the term "Ethnic Group". Since we are using these data, it is this interpretation of the term which we will accept.

"It is important to distinguish carefully between "citizenship" or "nationality" on the one hand and "ethnic" or "cultural" group on the other. "Ethnic" or "cultural" group refers to the group from which the person is descended; citizenship (nationality) refers to the country to which the person owes allegiance. Canadian citizens belong to many ethnic or cultural groups - English, French, Irish, Jewish, Scottish, Ukrainian, etc.

For Census purposes a person's ethnic or cultural group is traced through his father. For example, if a person's father is German and his mother Norwegian, the entry will be "German".

If the respondent does not understand the question

¹The 1961 Enumeration Manual of the D.B.S., Ottawa, p. 33.

as worded in the questionnaire, you will ask the language spoken by him on arrival if he is an immigrant, or by his ancestor on the male side on first coming to this continent. For example, if the person replies that his ancestor on the male side spoke French when he came to this continent, you will record "French". However, if the respondent should reply "English" or "Gaelic" to this question, you must make further inquiries to determine whether the person is English, Irish, Scottish, or Welsh.

If the respondent does not understand the question as worded on the questionnaire or you cannot establish the ethnic or cultural group through the language of the ancestor, you will ask "Is your ethnic or cultural group on the male side English, French, Jewish, Negro, North American Indian, Norwegian, Scottish, Ukrainian, etc."

Procedure for persons reporting British Isles:
If a person reports "British Isles" but does not know if he is English, Irish, Scottish, or Welsh, enter "British Isles" in the write-in space.

Procedure for persons reporting Native Indian:
(1) If a person reports "Native Indian" ask an additional question: "Is your name on any Indian Band membership list in Canada?" If the answer is "Yes", mark the space for "Band Member". If "No", mark "Non Band".

Note that "Treaty Indians" should be marked "Band Member".

(2) If the person is of mixed white and Indian parentage:

- (a) Consider those living on Indian reserves as "Indian" and determine Band status as outlined above.
- (b) For those not on reserves, determine the ethnic or cultural group through the line of the father.

Procedure for persons reporting "Canadian", "U.S.A.", or "Unknown":

Since this question refers to the time when the person or his ancestors came to this continent, the answer should refer to the ethnic group or cultures of the old world. However, if, in spite of this explanation, the person insists that his ethnic or cultural group is "Canadian" or "U.S.A.", enter his reply in the write-in space.

If the person states that he really does not know what to reply to this question, enter "Unknown".²

It is apparent from this outline that the ultimate accuracy of the statistical data obtained depends on the patience and tenacity of the enumerator, and the honesty of the respondent. We have to assume that the answers given are honest and accurate within the framework of the definition. Any discrepancies which may be discovered will of course be examined.

The Census uses the term "Ethnic Group" and "Cultural Inheritance" interchangeably, indicating that these two terms can be equated. A weakness of the definition seems to be that, in case the respondent does not understand the question on the questionnaire, the enumerator is instructed to find out the ethnic group or culture to which the person belongs by way of the language spoken by the respondent's ancestor when he (through the male line) first came to this continent. This means that in some cases the definition is applied on a linguistic basis. This is not a very serious weakness, however, since most ethnic groups are closely related with, and in most cases are identified with, the language which they speak.

What are the consequences of such a definition?

1. There are no Americans, because any American immigrant to Canada is ethnically identified with

² Ibid., p. 33-34.

his ancestor through the male line, when he first came to this continent.

2. There are no Canadians, in the sense of a Canadian ethnic origin, for the same reasons as under (1). Note however, that under the section "Procedure for persons reporting Canadian, U.S.A., or Unknown origin, there is made a provision for such persons to report to the enumerator that they are of Canadian or U.S.A. origin.³ For Alberta, in the 1961 Census, persons answering "Canadian origin" to this question amounted to 5,468.⁴ They are included with the category "Other", a category in which are furthermore included 1,307 Negroes; and all other persons who did not know what to answer to the question concerning their ethnic descent, of which there were 8,249.
3. Perhaps the most serious consequence of the definition is that, after several generations of intermarriage among ethnic groups, the individual who is perhaps one eighth German, one eighth Chinese, one quarter British and one half French, may have been reported as Chinese, be-

³Ibid., p. 34.

⁴Personal communication with Mr. R. J. Davy, Chief, General Population Section, Census Division, Ottawa, Aug. 12, 1965.

cause his ancestor along the male line was Chinese. If such situations are the rule for Alberta, the ethnic group distribution maps begin to lose their value, because the very definition by which the Census takes the ethnic group enumerations begins to become meaningless.

Indeed, for many individuals the term "Ethnic Group", as applied to them is meaningless. The number of generations an ethnic group, or part of an ethnic group has resided in Canada thus becomes an important factor. First generation immigrants are those which are assumed to be of pure stock. Each succeeding generation can be potentially diluted by one half. Thus the fourth generation can be one sixteenth of what the father of the first generation was, assuming that the children of each generation marry somebody of pure stock of another ethnic group. The situation becomes very complicated when we take into consideration marriages among people of already diluted stocks.

There is a tendency for ethnic groups to marry within their own group. Hurd has shown this to be the case for the French.⁵ If we assume this to be the case for other ethnic groups as well, the rate at which interethnic marriages take place becomes less than the maximum rate possible. We may assume furthermore that the rate at which inter-

⁵Hurd, W. B., "Is there a Canadian Race?", Queens Quarterly, Vol. 35, 1927-'28, p. 617 ff.

ethnic marriages are taking place will be in proportion to the time of residence of the ethnic groups in this country, or on this continent. Thus the second generation will more likely marry somebody not of his, or her own ethnic group, than the first; the third generation more likely than the second etc. Where to draw the line, when the term "Ethnic Origin" for an individual becomes meaningless, is difficult to determine. It is our opinion, however, that the term is still meaningful even after the third or fourth generation, because, although the maximum possible dilution with the fourth generation is one sixteenth, maximum dilution almost never takes place.

TABLE I - FOREIGN BORN POPULATION AS A PERCENTAGE OF THE TOTAL POPULATION BY INTERCENSAL PERIODS FROM 1901 TO 1961, FOR ALBERTA

Year	Persons Born Outside Canada or the United States	Total Population of Alberta	Per Cent of Total Foreign Born, to Native Born
1901	48,100	73,022	66.0
1911	273,780	374,295	73.0
1921	347,457	588,454	59.0
1931	423,752	731,605	57.9
1941	364,551	796,169	45.8
1951	184,512	939,501	18.5
1961	237,249	1,331,944	17.8

Source: Compiled from the Canadian Censuses of the years shown.

An examination of Table I shows that, prior to 1931, more than fifty per cent of the population of Alberta was born outside of Canada or the U.S.A. The greatest influx of "foreign-born" immigrants occurred in the period from 1901 to 1911. A continuous decrease in the percentage foreign-born after 1931 leaves a percentage foreign-born in 1961 of 17.8.

The ethnic groups shown on the 1961 ethnic distribution map series in this study are thus 17.8 per cent first generation immigrants. The majority of the remainder have been on this continent for at least one generation, but at most for three generations.

We may conclude that some dilution through inter-ethnic marriage has occurred, but that the majority of the population of Alberta is still of relatively pure original stock. Maps showing the distribution of the ethnic groups in Alberta according to the 1961 Census are in our opinion still useful, and perhaps some significant conclusions can be drawn from any patterns which may show.

CHAPTER II

THE CARTOGRAPHIC ASPECTS OF THE STUDY

Since the map series showing the ethnic distribution in Alberta forms the core of the study, it is useful to devote some space to a discussion of the methods employed in producing the map series.

The Statistical Base Map

The Census statistics used were those for "Ethnic Groups by Enumeration Areas".¹ For census taking purposes, the province was divided into seventeen Electoral Districts, numbered from 801 to 817. Each Electoral District was subdivided into Enumeration Areas. The number of Enumeration Areas in the Electoral Districts ranged from 132 to 245. There were some 2,854 Enumeration Areas in Alberta in 1961. A description of the boundaries of the Enumeration Areas was available, but no map showing these boundaries. Therefore, a map was constructed, from the descriptive index, on a scale of one inch to sixteen miles, showing the boundaries of the Enumeration Areas. The base for this map was obtained from a map of the same scale, produced by the Department of Lands

¹Unpublished Statistics, Dominion Bureau of Statistics, Ottawa.

and Forests of the Province of Alberta. Boundaries of the Enumeration Areas within the city of Edmonton and Calgary were plotted by Mr. J. Lester. The one inch to sixteen miles map of Alberta, with the boundaries of the Enumeration Areas plotted thereon was used as a statistical base map for plotting the actual data. A reduced version of this map appears on the next page.

The Transfer of the Data

To plot the distribution of the individual ethnic groups, eleven Ozalid copies of the base map were made on the same one inch to sixteen mile scale. In the Enumeration Areas delineated on these maps the number of individuals of an ethnic group was written in.

Most incorporated cities, towns, villages and even some of the smaller settlements consisted of more than one Enumeration Area. The ethnic groups in the Enumeration Areas which made up a city, town, village or settlement, were totalled and the totals entered on the map. The totals for the city of Edmonton included Jasper Place, Beverly, the Griesbach Barracks and the Namao RCAF station. The totals for the city of Calgary, included Forest Lawn, Bowness, Montgomery, Lincoln Park RCAF station and Currie Barracks. The Edmonton metropolitan area was made up of some 563 Enumeration Areas, and the Calgary metropolitan area of some 378 Enumeration Areas. The series of base maps with the numbers written within the boundaries of the Enumeration Areas, re-

presenting the number of persons of the specific ethnic group living within those boundaries, and a number for each city, town, village and settlement, representing the number of persons of the specific ethnic group living in those places, yielded the necessary data for the final stage of the production of the maps.

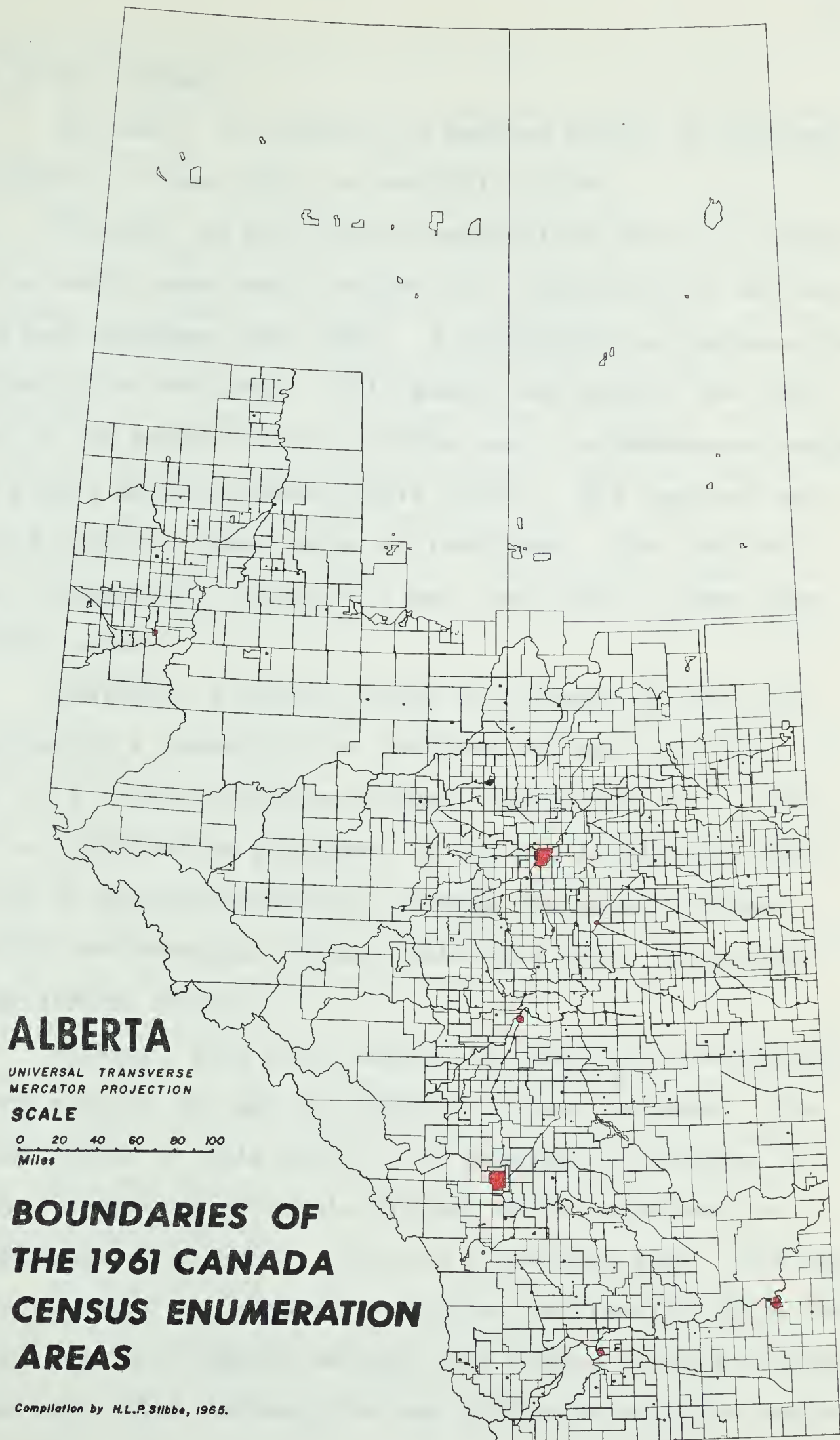
Symbolization of the Data

The data to be portrayed expressed variations in quantity, from place to place, within classes of population. The classes of population in this study were ethnic groups. The choice of cartographic symbols to present quantitative data visually are numerous. The many techniques and methods available to portray the distribution of ethnic groups on a map will not be discussed.² A discussion of the advantages and disadvantages, and the reasons for the choice made is more meaningful.

The dot map is a map where the data are represented by varying numbers of uniform dots, each representing the same amount. This technique was chosen for representing the data on the ethnic distribution maps for several reasons.

Firstly, the technique provides the best visual impression of density variations, by varying the frequency of the dots in a given area, thus enabling easy comprehension,

²For a discussion of population mapping techniques, and examples for Alberta according to the 1961 D.B.S. Census, see: Fung, K. I., Some Aspects of Population Mapping, Unpublished M. Sc. thesis, Univ. of Alberta, Edmonton, 1965.



MAP 1.

even by the layman.

Secondly, it renders the maximum amount of accuracy of location if the dots are carefully placed.

Thirdly, no additional computations have to be made, such as would have been the case if a choropleth or an isopleth map technique were used. A choropleth map relates the statistics to the areas. This means that within the boundaries of the areas depicted on the map, the phenomenon mapped lies within selected quantitative limits. The isopleth map employs lines of equal value or isarithms. The isarithm passes through all points on a map that have the same quantitative value.

Fourthly, a faulty choice of interval in the construction of a choropleth or isopleth map may introduce bias, or a totally different visual impression of the density or distribution patterns. A dot map eliminates these factors of misinterpretation, because the dots represent directly the numerical values, while the other techniques employ derived values.

Fifthly, with a dot map it is possible to calculate for any area of the map the density of the phenomena. For the map series in this study it is possible to compare the relative densities of ethnic groups, or to calculate the predominance of an ethnic group in a specific area. One has merely to count the number of dots in the area for which the density has to be known, multiply the number of dots counted by the unit value for each dot and divide this by the number

of square miles represented by the area.

On the other hand, there are some disadvantages to the dot technique. One is that the initial statistical data to be used, have to be adequately detailed with respect to location. The smaller the areas for which the statistics are given, the better. Since the Enumeration Areas are designed so that the populations within their boundaries are approximately the same, it follows that in regions which are sparsely populated, the Enumeration Area becomes larger than in regions which are more densely populated. This can readily be seen on the map on page 14. In northern Alberta, where the population density is very low, the Enumeration Areas are large, while around Edmonton and Calgary, in the urban fringe, the Enumeration Areas become small, indicating a high population density. This rule is not valid for the Indian Reserves and Military Reserves, which are designated an Enumeration Area regardless of the population within their boundaries. In urban areas furthermore, the population contained within an Enumeration Area tends to be several hundred persons more than in rural areas. These factors set a definite limit to the accuracy of location of the dots in the map series. The location of the dots is least accurate in the sparsely populated areas, and most accurate in the densely populated areas.

Another disadvantage is, that the dot technique becomes extremely difficult, if not impossible to use, when there is a large disparity between densities of population from place to place, as is the case between

rural and urban areas. The dot technique is therefore not applied to the urban area ethnic populations of the map series in this study. Instead, the urban area ethnic populations are portrayed by means of proportionate circles. This means that the area of the circle is proportionate to the number of persons it represents. The manner by which the proportionality of the circles was obtained will be discussed below.

The size of the dots and their unit value were determined with the use of a nomograph.³ The nomograph gives the relationship between "Dots per square inch", and "Aggregate area of dots in square inches", and it also shows "The diameter of dots in square inches, distance between dots, and the zone of coalescing dots". By experimenting with different dot unit values, using them in areas of maximum density and areas of minimum density, a dot value was obtained of fifty persons per dot, using a No. 4 Leroy pen, and mapping on a scale of 1:2,000,000.

It was also decided that the distribution of each ethnic group was to be shown on a separate map. To be able to compare the distribution patterns of the ethnic groups, it would have been advantageous to show several, or all ethnic groups on one map, using some appropriate technique. To permit several or all groups to be shown on

³ Mackay, J. R., "Dotting the Dot Map", Surveying and Mapping, Vol. 9, 1949, pp. 3-10.

one map would involve the use of more than two colors, or the use of transparent overlays. Such techniques are entirely feasible but costly, and hence not employed here. Moreover, when separate maps are used, the dot value chosen can be smaller, because only one ethnic group has to be shown per map, thus representing fewer persons and permitting more detail. The detail, using a dot value of fifty, is justified because of the detail of the statistical data, and additional data, to be discussed below, which made it possible to compensate for the factors of inaccuracy of location.

The Final Mapping Procedures

One of the statistical base maps on a scale of one inch to sixteen miles was photographically reduced to a scale of one inch to approximately 31.6 miles or 1:2,000,000. The final mapping was done on this scale. A piece of dimensionally stable plastic material, Mylar, was taped onto this base map and the proportionate circles and the dots were then placed in their appropriate positions.

The proportionate circles were drawn in first. In the experimental stage it was found that five dots placed closely together to represent population in a town, village or settlement, could still be effectively read, did not take up too much space, and could not be easily confused with rural population. The maximum population of the ethnic group shown on any one of the maps to be represented by dots was therefore $5 \times 50 = 250$ persons. Thus, a population of the ethnic group

shown of 300 or more, was represented by proportionate circles. An appropriate scale was worked out for the proportionate circles, taking into account the maximum number of persons to be shown in this manner, which was the population of "British Isles" origin in the city of Calgary, coming close to 200,000, and the minimum number of persons to be shown by proportionate circles, which was 300. If the area of a circle had to be in proportion to the number of persons it represented, the diameter of the circle had to be in proportion to the square root of the persons it represented. The circles were thus made by obtaining the square root of the number of persons involved, and then determining the exact size by referring to the scale constructed.

Next, the dots, representing the remaining populations in the towns, villages and settlements were placed in their appropriate positions, and last, the dots representing the remaining rural population.

To compensate as much as possible for the inaccuracy of location of the dots in sparsely populated areas, the general population map, according to the 1961 Census, compiled by Mr. K. I. Fung was used as a guide.⁴ This dot map was compiled by Mr. Fung using air photos, and Census data, for determining the position of the dots as accurately as possible, especially in sparsely populated areas. This map proved especially useful in locating the populated rural areas in northern Alberta, and in central western Alberta, where the Enumeration Areas are so large as to enable gross

⁴Fung, K. I., op. cit., map in pocket.

inaccuracies in placement of the dots. The map was also very useful in the positioning of the dots within the Indian Reserves and Military Reserves.

The Topographic Base Map

The topographic base map was drawn on the same scale as the dot maps, and on the same material. This base map was compiled from two sources. The hydrography was taken from a 1:2,000,000 scale film positive, produced for the Atlas of Alberta by the Department of Lands and Forests of the Province of Alberta, while the remaining data were taken from the 1:2,000,000 scale map of the Prairie Provinces, produced by the Department of Mines and Technical Surveys, the Surveys and Mapping Branch, Ottawa.

The map serves the purpose of location identification. The information on this map is kept to a minimum in order to keep the finished map, including dots, as legible as possible. The following features are shown on this map: the main river systems and lakes; all cities; major towns; Indian Reserves; National Parks and the names of rivers, lakes, cities and towns.

Printing

Since the maps were to be printed in two colors, two plates were necessary for each map. The topographic base map however could be used with each of the dot patterns, since the information on this map did not require change. The Mylar sheets, showing only the dots and the name of the

ethnic group represented by the dots, were photographically reduced to a scale which would fit a standard eight by eleven inch page. For each of the dot patterns a printing plate was made up. The process was repeated for the base map with the legend. One plate each for the eleven dot patterns of the ethnic groups and one for the base map were thus made up, giving a total of twelve plates.

The base map was printed in a light color, for which light-blue was chosen. The dots were printed on top of the base map in red. The light-blue color was chosen in order to prevent dots from disappearing should they fall over a letter or line of the base map. If the dots and the base map had been both printed in the same color, this situation would certainly have arisen. Appropriate registration marks were drawn on each map, in order to register both plates as accurately as possible.

On the final product, the lakes and the circles representing the populations in the urban areas were colored-in by hand in light-blue and yellow respectively, in order to bring out these features better, since at some localities the circles were drowned in clusters of red dots which made them almost undistinguishable.

CHAPTER III

QUANTITATIVE MEASURES EMPLOYED

To portray the distribution of ethnic groups in Alberta, a cartographic technique has been chosen. This technique is well suited for a visual appreciation of the population patterns which emerge. The dot technique and dot map shows particularly well the variations of density within a territory. A preliminary examination of the map series discloses that areal variation in the distribution patterns of the ethnic groups do exist, and that these areal variations for the most of the individual groups do not coincide. The dissimilarities in the distribution of some of the ethnic groups is conspicuous.

One characteristic seems to emerge most forcefully, namely, the tendency of some of the ethnic groups to cluster in particular locations. The distribution patterns of the ethnic groups will be examined in reference to this characteristic. In addition to the clustering, the distribution of each ethnic group in relation to the whole territory of the Province of Alberta will be examined. The chapter will be devoted to a discussion of some quantitative measures, to be used in measuring the above mentioned characteristics, and to define these characteristics further.

The Index of Concentration

John K. Wright evolved measures of population concentration for studies of population distribution.¹ Edgar M. Hoover gave an alternative method of computation of the measures which were used by Wright.² The latter method could be readily adapted for the use as a measure of ethnic concentration. It should be pointed out here, that the "Index of Concentration" was a label given to this measure by Wright. As will be seen later in this chapter, the measure was inadequate for the purpose of measuring the tendency of an ethnic group to form enclaves, or for dots to form clusters on the dot distribution maps. It is a measure which enables one to examine how the population distribution relates to the area which it occupies.

The Index of Concentration (Δ) is computed according to the formula:

$$\Delta = \frac{1}{2} \sum_{i=1}^k |X_i - Y_i| \quad 3$$

where

k is the number of areas considered

X_i is the percentage population

Y_i is the percentage area

¹Wright, John, K., "Some Measures of Distribution", Annals of the A.A.G., XXVII, Dec, 1937, pp. 177-211.

²Hoover, Edgar, M., Jr., "Interstate Redistribution, 1850 - 1940", Journal of Economic History, I, Nov. 1941, pp. 199-205.

³Duncan, O. D., "The Measurements of Population Distribution", Population Studies, Vol. XI, 1957-'58, p. 30.

It is possible to calculate the Index of Concentration for each ethnic group on the basis of Enumeration Areas. This would involve some 28,540 computations before the formula could be applied to give an index for each ethnic group. To reduce the number of computations, we can choose larger areas, such as Census Divisions. The value of the index is, in general, directly related to the number of areal units into which the territory is sub-divided, or inversely related to the average size of the units. An index computed for a given set of areal units cannot be larger than the index computed for a set which comprises sub-divisions of the first set. The index value must thus be considered relative to the system of areas on which it is based.

Table II shows the Index of Concentration for each ethnic group, computed on the basis of Census Divisions in Alberta. For this set of indices, $k = 15$, since there are fifteen Census Divisions in Alberta; X_i is the population of the specific ethnic group in the specific Census Division as a percentage of the total population of that ethnic group in Alberta; and Y_i is the area of the specific Census Division as a percentage of the total area of Alberta. The values for X_i and Y_i , for each ethnic group, appear in the Appendix in the tables entitled "Components of the Index of Concentration". The formula when expanded and applied to the problem in this study, reads as follows:

$$\begin{aligned} \text{Index of Concentration } (\Delta) &= \frac{1}{2} \sum_{i=1}^{15} |X_i - Y_i| \\ &= \frac{1}{2} \left\{ (|X_1 - Y_1|) + \right. \\ &\quad \left. + (|X_2 - Y_2|) + \dots + (|X_{15} - Y_{15}|) \right\}. \end{aligned}$$

TABLE II - INDICES OF ETHNIC CONCENTRATION FOR ALBERTA,
1961

Ethnic Group	Index of Concentration
British Isles	64.69
German	63.04
French	47.24
Slavonic	61.22
Scandinavian	61.34
Dutch	64.36
Italian	70.87
Other European	64.05
Asiatic	72.95
Indian & Eskimo	29.15
Other	70.75

Sources: Computed from Table 34 and 37, D.B.S., 1961 Census

For a set of indices, Y_i is constant for all ethnic groups, and X_i is the variable. It can be seen from the formula that for a given set of indices, the larger the index, the greater the unevenness of distribution. For a completely even distribution $\Delta = 0$, because the population contained in each areal unit of the set will be in direct proportion to the area of that unit, making X_i equal to Y_i , and $|X_i - Y_i| = 0$. For a maximum concentration, where the total population is concentrated at one point, $\Delta = 100$, because $|X_i - Y_i| = 200$.

The set of indices compliments the dot maps. The indices give a quantitative measure expressing the relation-

ship between population and area. With these measures, the characteristics of the distribution patterns shown on the maps can be better understood and analyzed.

An Index of Areal Segregation

The Index of Concentration will be used as a quantitative measure in order to examine the relationship between population and area. The index is a measure of displacement. It can be interpreted as the percentage of the Albertan population which would have to move from their area of present residence in order to make the densities of all areal units equal (disregarding any unevenness within areal units). It has been pointed out earlier, that the index is related to the number and size of the areal units used. The disadvantage of this fact, inherent in the formula, is that for two different sets of indices, where different areal units are used, the indices cannot be compared. Any comparison made is only possible within a set. The application of the Index of Concentration to the problem presented in this study has another inherent difficulty. The index reveals how the specific ethnic group distribution relates to the area which it occupies; there is no relationship shown between it and the other components of the population which occupy the same area. Thus each index, for each ethnic group has to be examined on its own, and separate from the others.

To measure the "separateness" of an ethnic group,

as compared with other ethnic groups, the Index of Concentration is unsatisfactory. More specifically, we want a quantitative measure by which the tendency of a specific ethnic group to cluster, or to form enclaves, more, or less than other ethnic groups in the same area can be evaluated. Such a measure was worked out on the basis of the following assumptions and considerations.

The first assumption made was, that if no ethnic group showed a tendency to cluster or form enclaves, then an even mixture of all ethnic groups would exist in the unit area under consideration. For any subdivision of the unit area, the same rule would apply. This can be expressed quantitatively by stating that for a specific sub-area, the percentage of the specific ethnic group under consideration in the sub-area, compared to the total population of that specific ethnic group in the unit area, must be equal to the percentage total population in the sub-area, compared to the total population in the unit area. If we assign the symbol X_i to the percentage of the specific ethnic group in the sub-area "i", compared to the total population of that ethnic group in the unit area, and assign the symbol P_i to the percentage of the total population in the sub-area "i", compared to the total population in the unit area, then the ratio X_i/P_i for an even mixture of all ethnic groups in sub-area "i" will be 1.

The second assumption made was, that any deviation from 1, in the ratio X_i/P_i will be indicative of the tend-

ency of the ethnic groups to cluster or form enclaves. Incorporating all sub-areas in which the unit area may be divided, the above ideas can be expressed in the following formula:

$$\Delta a = \frac{\sum_{i=1}^k |X_i/P_i - 1|}{k}$$

where

k is the number of sub - areas

X_i is the population of the specific ethnic group in sub - area "i" as a percentage of the total population of that ethnic group in the unit area

P_i is the total population in sub - area "i" as a percentage of the total population of the unit area.

We will label the index obtained from the above formula the Index of Areal Segregation. This index is simply the mean of all deviations of the sub - areas from an even mixture of all ethnic groups, represented by the ratio $X_i/P_i = 1$. The values for X_i and P_i , for each ethnic group, appear in the Appendix in the tables entitled "Components of the Index of Areal Segregation". The formula when expanded and applied to the problem in this study, reads as follows:

$$\text{Index of Areal Segregation } (\Delta a) = \frac{\sum_{i=1 \rightarrow 15}^{15} |X_i/P_i - 1|}{15}$$

$$= \frac{(|X_1/P_1 - 1|) + (|X_2/P_2 - 1|) + \dots + (|X_{15}/P_{15} - 1|)}{15}$$

The index has the advantage of being independent of area. The large spaces in northern Alberta devoid of any population, tend to off-set the value of the Index of Concentration from what one would expect when the dot maps are examined.

TABLE III - INDEX OF AREAL SEGREGATION FOR ETHNIC GROUPS,
ALBERTA, 1961.

Ethnic Group	Index of Areal Segregation
British Isles	0.16
German	0.36
French	0.66
Slavonic	0.55
Scandinavian	0.32
Dutch	0.34
Italian	0.79
Other European	0.31
Asiatic	0.57
Indian & Eskimo	1.48
Other	0.36

Source: Computed from Table 37, D.B.S., 1961 Census

A point in case is the Index of Concentration of the Indian and Eskimo group, when compared with the Index of Areal Segregation for this group. The Index of Concentration for this group has the lowest value in the set, indicating an even distribution. The Index of Areal Segregation for the same group, has the highest value in the set, indicating a high tendency to cluster.

For each Census Division and for each ethnic group, the deviation from the ratio $X_i/P_i = 1$, forms another series of sets, making it possible to examine the tendency of any

particular group to cluster within a Census Division. These sets appear in the Appendix in the last column of the tables entitled "Components of the Index of Areal Segregation, Alberta, 1961".

It is obvious from the above discussion, that the higher the numerical value of the index, the greater the tendency of the specific ethnic group to cluster.

CHAPTER IV

THE ETHNIC DISTRIBUTION PATTERNS IN ALBERTA

The population of Alberta is by no means evenly distributed over the entire territory of the province. The greater part of the province is only sparsely populated, or not populated at all. Settled areas in Alberta lie primarily east of a line which follows approximately the base of the foothills of the Rocky Mountains from the United States border to Rocky Mountain House, then runs northeast to Buck Lake. From Buck Lake the line swings in a northwesterly direction to the North Saskatchewan River and from there straight north to the town of Evansburg. From Evansburg the line runs in a northwesterly direction to the town of Whitecourt, follows the Athabasca River to its confluence with the Pembina. The line swings from this point eastward to the town of Athabasca, then to Lac La Biche, and southeastward to Cold Lake and the Saskatchewan border. Within this southern and eastern part of the province, the bulk of Alberta's population can be found.

A second settled area in Alberta can be found in the Peace River region. The population in this area is located north of the Smoky River and the Little Smoky River, and extends north of the Peace River as far as the town of

Manning.

In addition to these two main areas, which are more or less continuously occupied, there are a few isolated areas of settlement around the town of Vermilion on the Peace River in northern Alberta, and around the town of McMurray on the confluence of the Athabasca and Clearwater Rivers. Some narrow strips of settlement along major transportation routes extending from the above described major settled areas complete the picture of occupied areas in Alberta. Strips are particularly pronounced along the railroads and highways leading to the major breaks in the Rocky Mountains in the west.

It is important to keep the boundaries of the above described settled areas in mind. The territory outside the continuously settled areas is so sparsely populated, that it affects the quantitative measures used to a considerable degree.

Population of British Isles Origin

People from the British Isles formed the largest single ethnic group in Alberta. There were a total of 601,755 persons in this category. They included persons from English, Scottish, Irish and Welsh descent. The majority of them, as was the case with almost all other ethnic groups, were living in the urban centers. The Edmonton and Calgary metropolitan areas absorbed more than half of the total population of British Isles origin, namely 309,922 persons.

The remaining cities in Alberta: Wetaskiwin, Red Deer, Camrose, Lethbridge, Medicine Hat, Lloydminster, Drumheller and Grande Prairie absorbed another 50,220 persons of British Isles origin. This amounted to 8.35 per cent of the total. This means that 59.7 per cent of the population of British Isles origin lived in the larger urban centers in Alberta. This is well exemplified by the values of the components of the Index of Concentration, (see the table for this group in the Appendix).

For the British Isles group, the values of $|X_i - Y_i|$ are highest in Census Divisions 6, 11, 12 and 15. Census Divisions 6 and 11 have high values for a different reason than Census Divisions 12 and 15. Census Divisions 6 and 11 contain 60.42 per cent of the total population of British Isles origin, while these Census Divisions constitute only 4.24 per cent of the total area of the province. The population of British Isles origin is thus highly concentrated in these two Census Divisions. The great disparity between population and area is the determining factor for the value of $|X_i - Y_i|$ in these cases, the population being the overriding factor.

For Census Divisions 12 and 15, the area is the determining factor in the value of $|X_i - Y_i|$, since these two Census Divisions contain only 6.07 per cent of the population of British Isles origin, while they have an accumulated area of 57.44 per cent. The dot map shows that the population of British Isles origin is concentrated in the southern

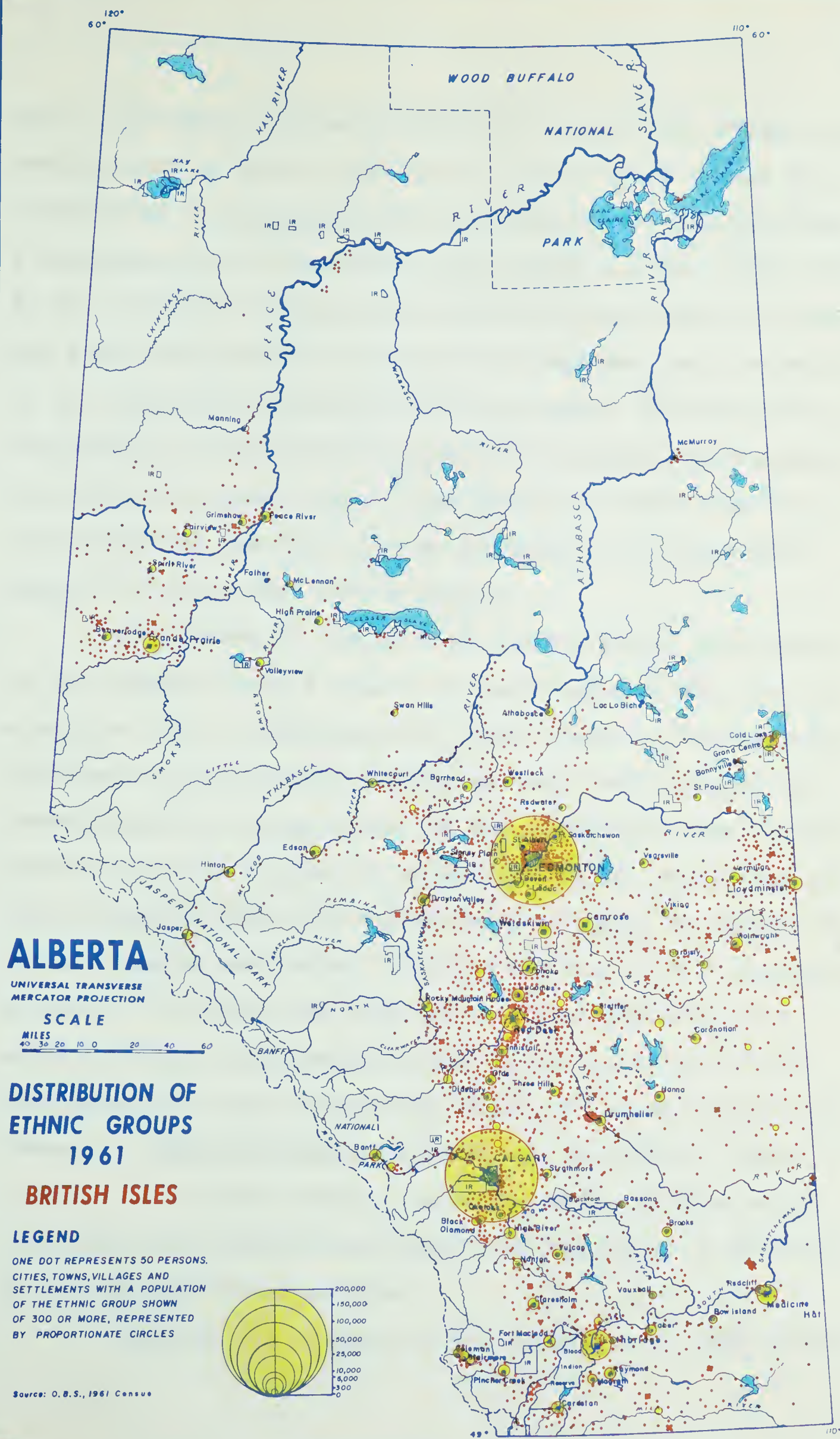
most parts of these Census Divisions: In the Peace River region in Census Division 15, and in the Cold Lake and Grande Centre area in Census Division 12. The remainder of these Census Divisions are virtually devoid of any population.

Census Division 9, which contains the Rocky Mountain region with Jasper and Banff National Parks, shows the same tendency towards a high value of $|X_1 - Y_1|$, for the same reasons as outlined above for Census Divisions 12 and 15.

The high values of $|X_1 - Y_1|$ for these five Census Divisions have affected the Index of Concentration of the British Isles group. The index is one of the highest in the set.

Census Divisions 6, 8 and 11 have the highest concentration of people of British Isles origin. Here, between Edmonton and Calgary, along the most important and busiest transportation route in the province, there exists a strip of dense population. A string of towns and cities is situated along this route. People of British Isles origin form a major part of this population strip. The strip continues south from Calgary towards Fort Macleod. South of Calgary the strip is not as wide nor as dense as between Calgary and Edmonton.

A conspicuous absence of persons of British Isles origin in an otherwise well settled area is shown on the dot distribution map in a location where the largest concentration of peoples of Slavonic origin occurs, namely in the region east of Edmonton, largely in Census Division 10; north-



ALBERTA

UNIVERSAL TRANSVERSE
MERCATOR PROJECTION

SCALE

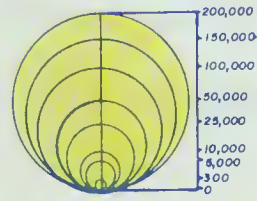


DISTRIBUTION OF ETHNIC GROUPS 1961

BRITISH ISLES

LEGEND

ONE DOT REPRESENTS 50 PERSONS.
CITIES, TOWNS, VILLAGES AND
SETTLEMENTS WITH A POPULATION
OF 300 OR MORE, REPRESENTED
BY PROPORTIONATE CIRCLES



Source: O. B. S., 1961 Census

east of Edmonton, in Census Division 11; and the extreme southwestern part of Census Division 12. One cannot escape the observation of the coincidence of transportation routes with a concentration of population along these routes. This points to the profound influence the transportation routes have had, and still have, on the settlement process and later expansion of the population patterns in the province. The patterns of settlement as they developed historically have to be examined to explain the phenomenon. Some aspects of the evolution of the population patterns will be discussed for each ethnic group, so far as they can be traced.

Well known is the fact that agricultural settlement in the prairie regions started to gain impetus with the construction of the railroads into these regions. The railroads provided the first swift, convenient and reliable means of transportation, giving access to the prairies. They also provided a reliable connection with the outside, which enabled the settlers to ship the agricultural products to markets in eastern Canada, and later to Europe and via British Columbia to Asia. In return for their agricultural products, the settlers could obtain manufactured goods, so vital for the settlements in their pioneering stage. It is not surprising therefore, that settlement followed the railroads. Ready access to a railroad became one of the major factors which determined the site for settlement for any group of settlers, or for the individual settler.

Prior to the arrival of the railroads in 1883, settle-

ment was scarce. An idea of the scarcity of people of British Isles origin in Alberta may be obtained from the 1881 Census¹, which gives a total of 2,873 persons of British Isles origin in all of the Territories. The Territories included present-day Saskatchewan, Alberta, the Yukon and North-West Territories, and the greater part of modern Manitoba. In present-day Alberta, the sub-districts of Edmonton had a total of 230 persons of British Isles origin, Bow River 180, Peace River 79 and Athabaska none. The arrival of the railroads seems to be an appropriate time in history to start an examination of the settlement process, as far as it is relevant to the ethnic group under discussion.

The period of initial agricultural settlement, coinciding with the construction of the railroads as defined by Morton², occurred from 1891 to 1901. The Canadian Pacific transcontinental railway, the first railroad to reach what is now the Province of Alberta, was completed to Calgary in August 1883.³ The Calgary - Edmonton line was completed on August 10, 1891.⁴ Progressive expansion of the railroad net and the areas which had access to them is shown on the map series reproduced from "The History of Prairie Settlement and Dominion Lands Policy".⁵ This expanding net of rail-

¹ Canadian Census of 1881, Table III, p. 300-301.

² Morton, A. S., "History of Prairie Settlement", in Mackintosh, W. A. and W. L. G. Joerg, (ed.), History of Prairie Settlement and Dominion Lands Policy, Vol. II, p. 99.

³ Ibid., p. 72.

⁴ Ibid., p. 96.

⁵ Ibid., p. 246-250.

roads correlates very closely with the evolving pattern of population distribution.

In contrast to many peoples with ethnic origins other than British, who settled in groups, the majority of the English speaking settlers who came into Alberta, came as individuals. They cannot be traced to where they settled exactly. Gibbon points out that "The Anglo-Saxons are scattered more uniformly over the prairies than any other origin group".⁶ We may thus assume that they followed the main trend in the settlement patterns as they were developing at the time.

The Calgary - Edmonton portion of the railroad, after its completion, was the scene of great activity. Moisture conditions here were better for agriculture than in southeastern Alberta. The strip along the Calgary - Edmonton line thus became settled quite early in the history of settlement. The Calgary - Edmonton population strip which developed at this time may be considered the central axis of population concentration from which further expansion took place. At either end of the strip, the cities of Edmonton and Calgary firmly established themselves as the two major urban centers in the province. This pattern, established so early in the history of settlement in the province, has maintained itself to the present day.

From 1901 to 1910 immigrants were pouring into the prairie regions, and Alberta, which became a province in

⁶Gibbon, J. M., Canadian Mosaic, McClelland & Stewart Ltd., Toronto, 1938, p. 76.

MAP 4.

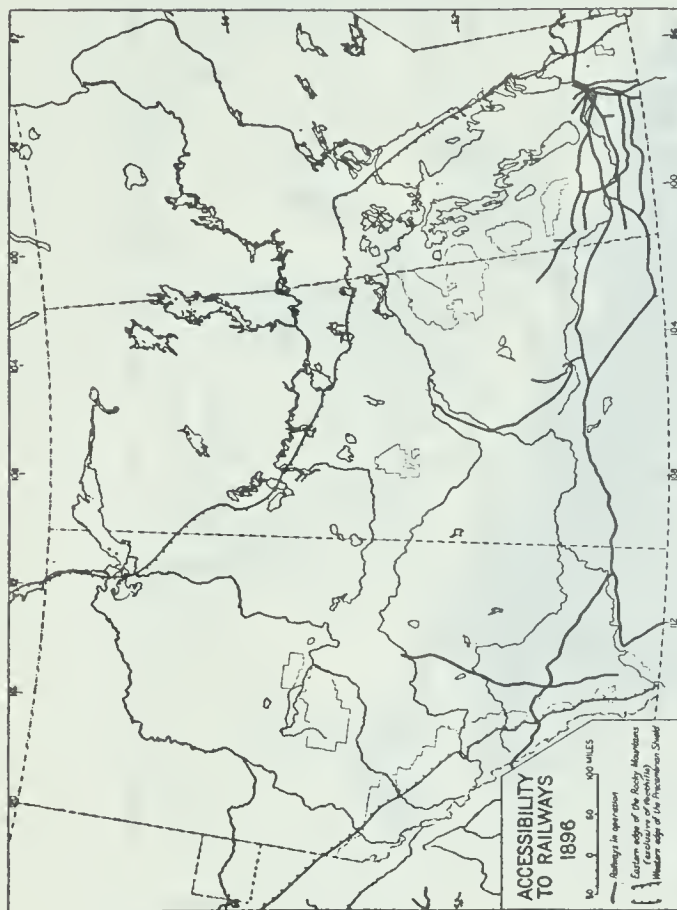


FIG. 11

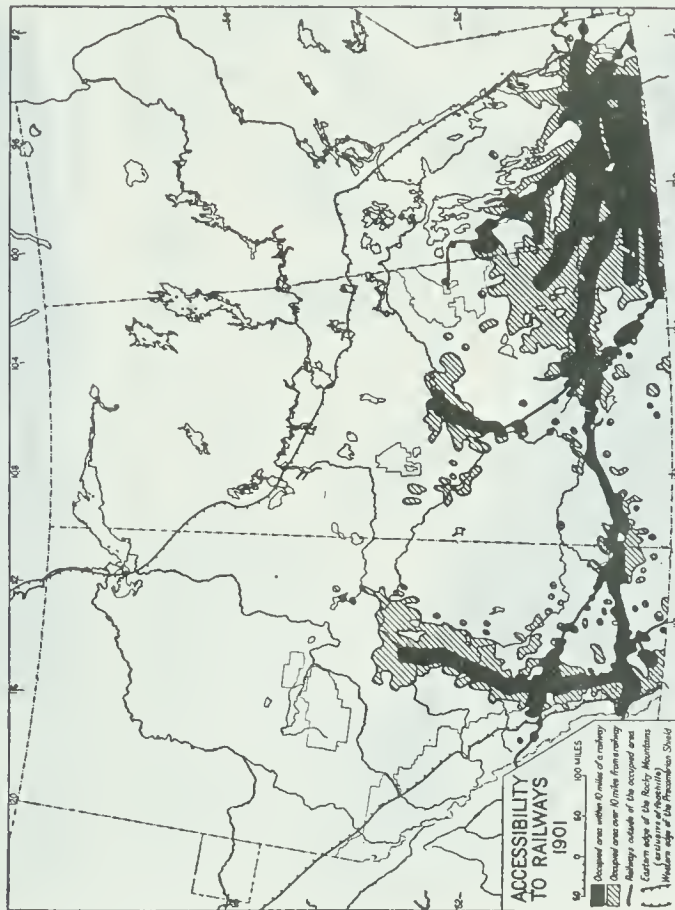


FIG. 12

For Figures 9-18 the year indicated in each map refers to June for the census of population and to December of the preceding year for the extent of the railway network. Railways are based on manuscript maps provided by the National Development Bureau, Ottawa; population is based on the quinquennial census published by the Dominion Bureau of Statistics, Ottawa. The settled area, shown from 1901 on (Fig. 12), is outlined from the township population shown in the census.

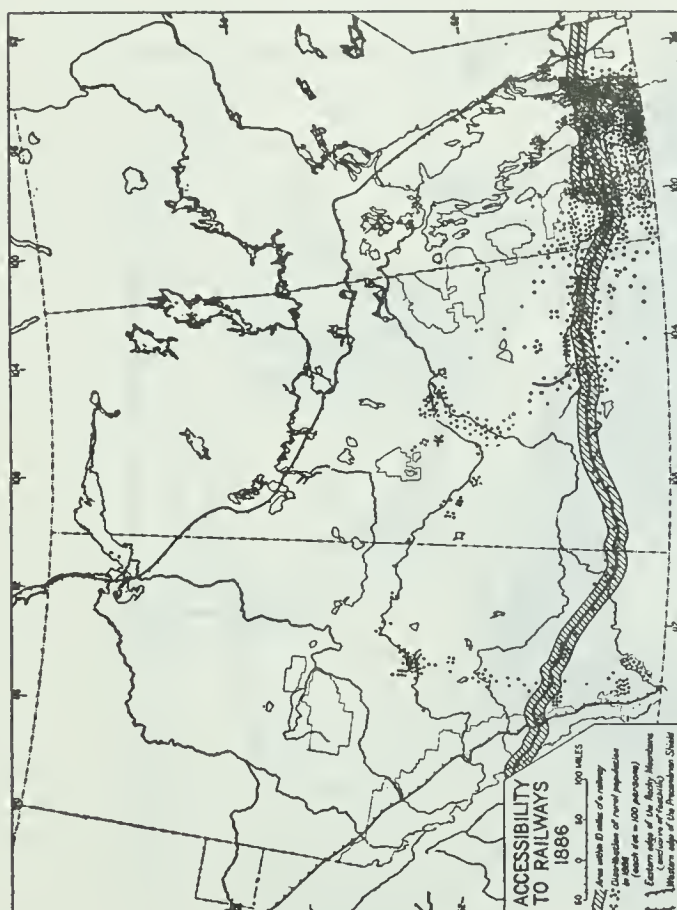


FIG. 9

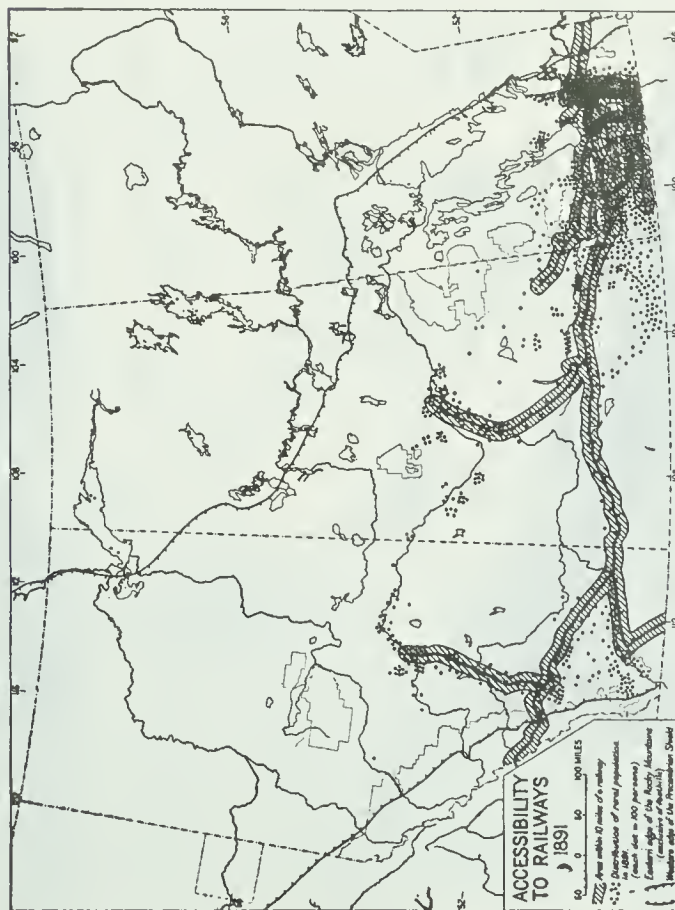


FIG. 10

FIGS. 9-18—A series of ten maps showing the relation of railways to the distribution of the rural population in the Prairie Provinces from 1886 to 1931. Accessibility is indicated by means of bands 20 miles wide enveloping the railway lines, 10 miles from a railway representing the economic range for agriculture. For further explanation see the legends on the maps. For sources see caption under Fig. 12.

MAP 5.

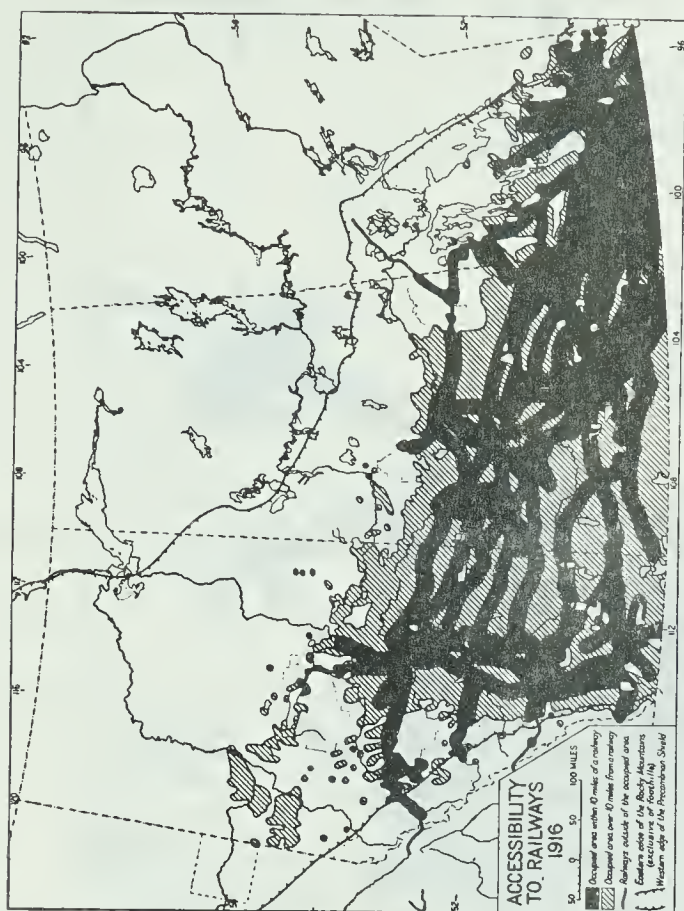


FIG. 15

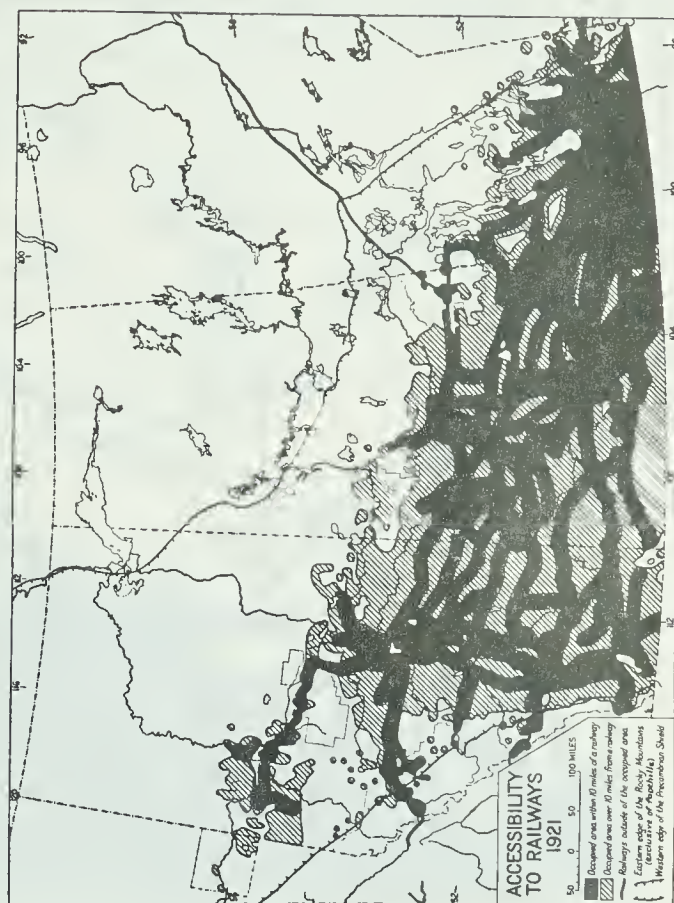


FIG. 16

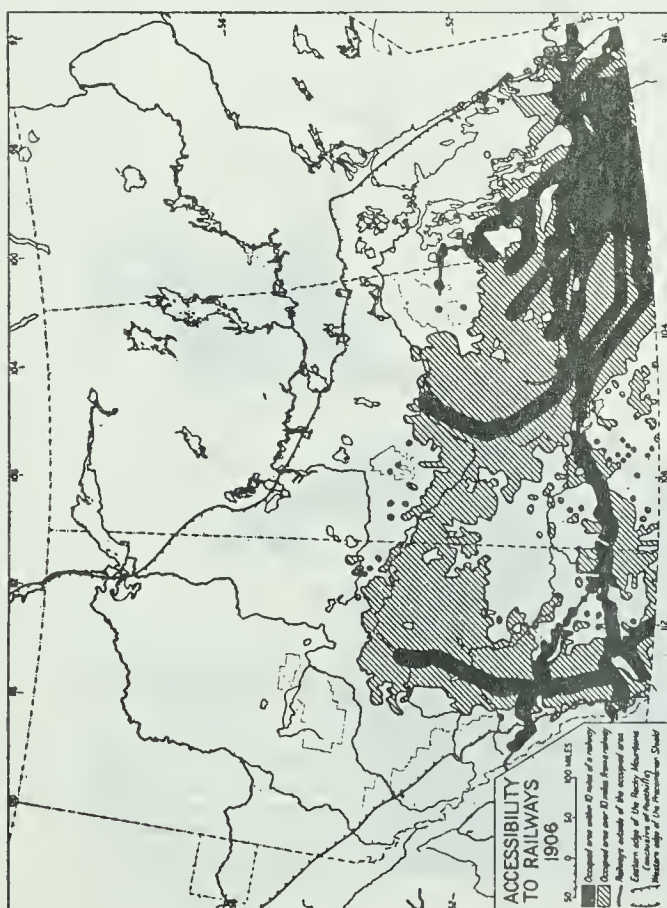


FIG. 13

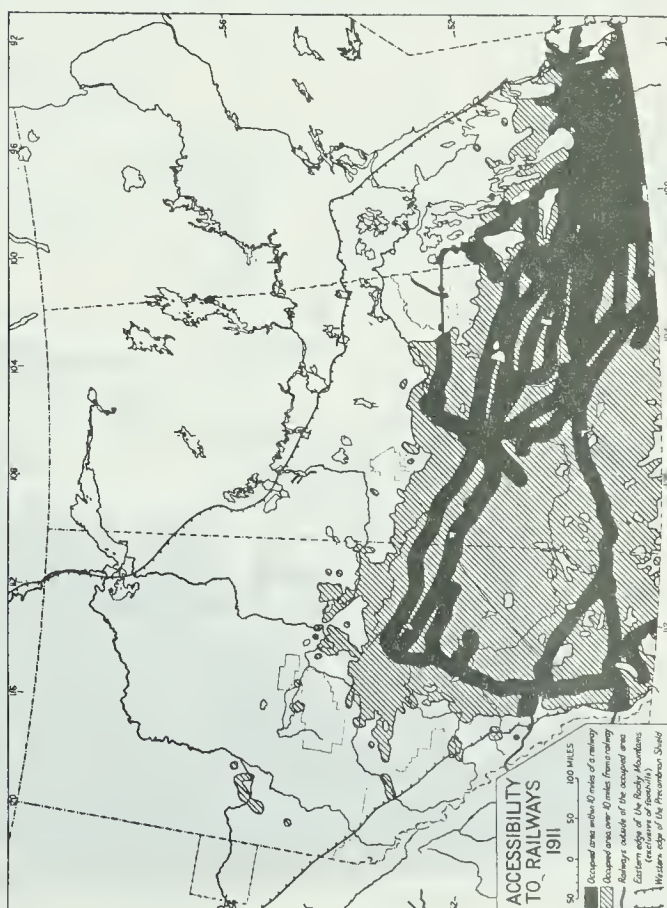


FIG. 14

MAP 6.

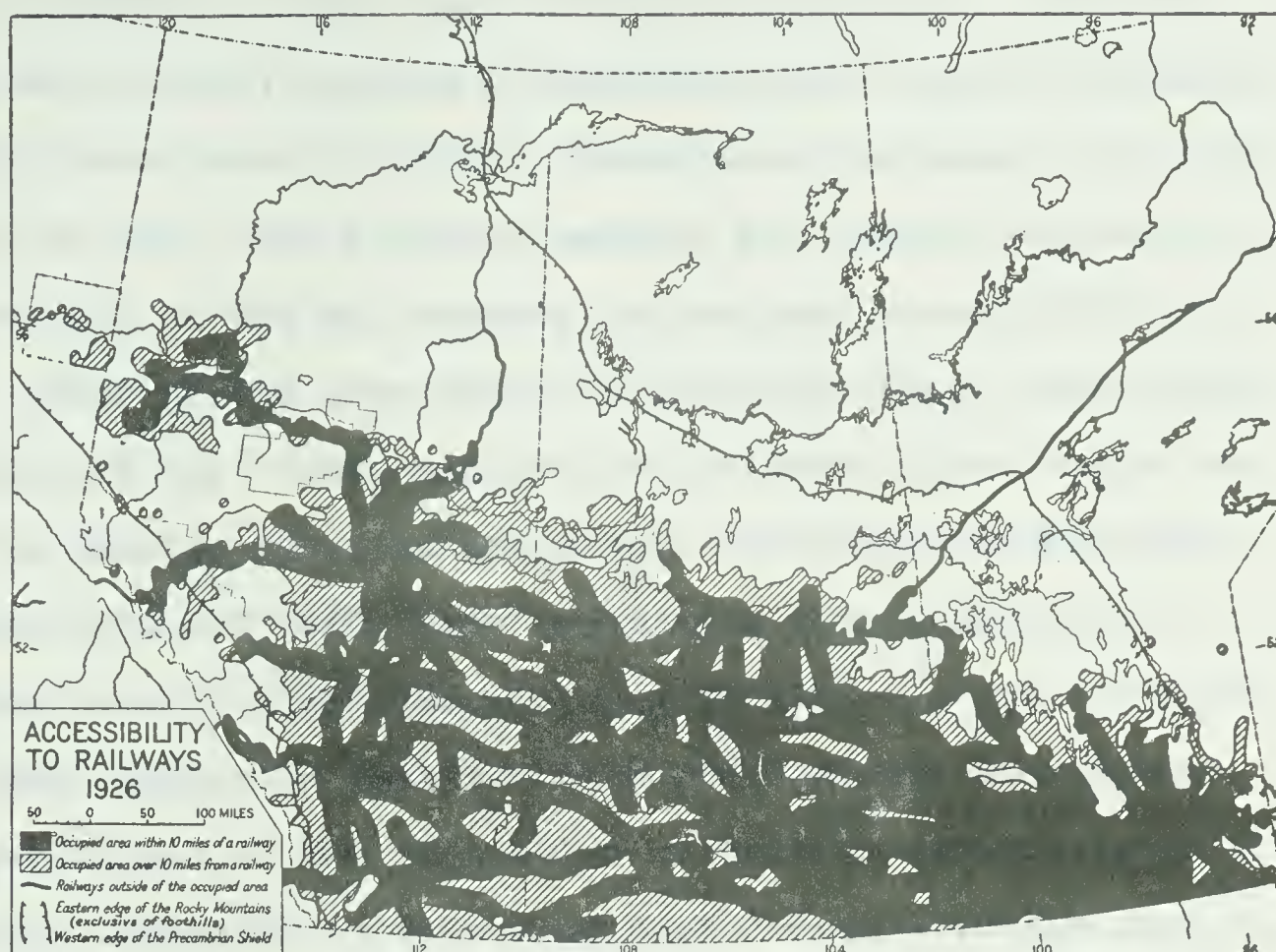


FIG. 17

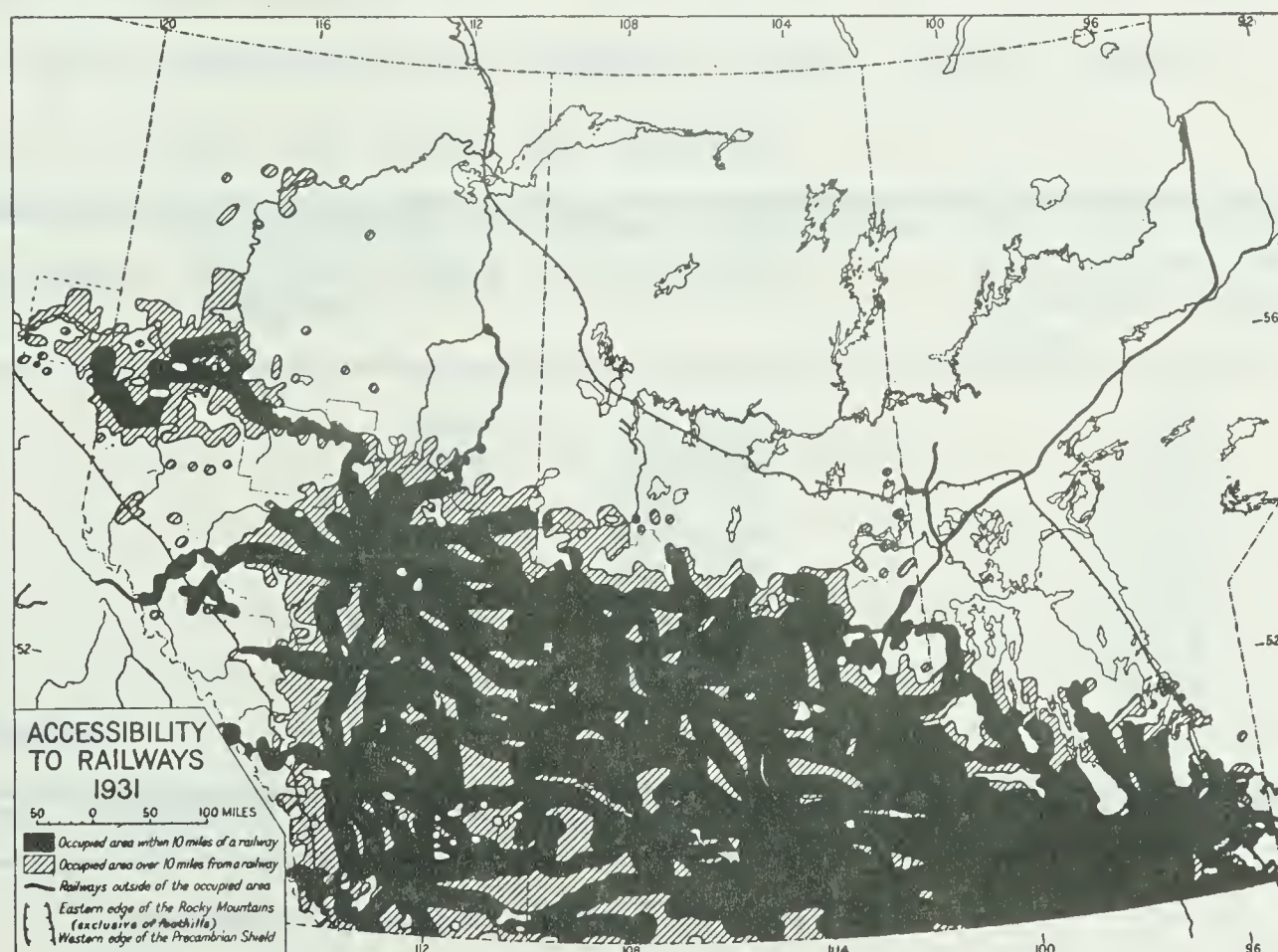


FIG. 18

Reproduced from Canadian Frontiers of Settlement Series, Vol. II, with permission of the Macmillan Co. of Canada Ltd.

1905, received a large part of these immigrants. In 1901, there were 34,903 persons of British Isles origin in Alberta. In 1911 there were 192,629.⁷ This is an increase of 550 per cent. By 1911, the railroad network had greatly expanded, as can be seen on the map showing the railway accessibility in 1911. Most of the area which is occupied today, was already occupied at that time, except for the Peace River region and the few smaller isolated areas near Vermilion and McMurray. Between 1901 and 1910, many immigrants with other ethnic origins than British were arriving in Alberta. In spite of the large influx of settlers with other ethnic backgrounds, the percentage of the population of British Isles origin actually increased in this time period from 47.8 per cent to 51.8 per cent in 1911.⁸

TABLE IV - POPULATION OF BRITISH ISLES ORIGIN FROM
1881 TO 1961 IN ALBERTA

Census Year	Population of British Isles Origin	Total Population in Alberta	Per Cent of Bri- tish Isles Origin to total popula- tion
1881	489*	18,450*	2.6
1901	34,903	73,022	47.8
1911	192,629	374,295	51.5
1921	351,820	588,454	59.8
1931	389,238	731,605	53.2
1941	399,432	796,169	50.1
1951	451,709	939,501	48.1
1961	601,755	1,331,944	45.2
*Estimated			

Source: Compiled from the Canadian Censuses of the years shown.

⁷Canadian Census of 1911, table VIII.

⁸Computed from table IV.

Table IV shows that the peak of predominance of British Isles origin population was reached in 1921. A continuous decrease in the percentage value since 1921 brought it down to 45.2 per cent in 1961.

The expansion of the population of Alberta into the Peace River area was dependent upon the increasing density and expansion of settlement in the southern areas of the prairie region. With a railway net well established south of the second Northern Alberta Transcontinental Railway through Edmonton, the Peace River region was brought closer to world markets. Until the Edmonton, Dunvegan and British Columbia Railway reached Peace River town in 1916,⁹ migrants had moved into the Peace River area via overland routes and via the natural waterways. After 1916, the real rush of settlement into the area began. The population in the Peace River area, (the Albertan part), increased 423.8 per cent from 1911 to 1916.¹⁰ In 1931, people of British Isles origin in the Peace River area in Alberta made up 50.2 per cent of the total population of that area.¹¹ This is a little less than the provincial average of 53.2 per cent for that year.

The settlement of the Peace River area marks the point in the settlement process in Alberta, at which the framework of the populated areas, as we see them today, was completed.

⁹ Dawson, C. A., and R. W. Murchie, "The Settlement of the Peace River Country", in Mackintosh and Joerg (ed.), op. cit., Vol. VI, pp. 35-36.

¹⁰ Ibid., p. 61.

¹¹ Ibid., p. 66.

The established settled areas expanded as the population grew, and absorbed increasing populations, until in 1961 the pattern previously established in the beginning of this century was determined, with only minor modifications. Gibbon's statement, made in the forties, still holds true today, as can be seen on the map showing the distribution of people of British Isles origin in 1961.

Within the outlined settled areas, the people of British Isles origin in 1961 show the least tendency to cluster. The Index of Areal Segregation for the British Isles origin group has the lowest value of all ethnic groups in Alberta, (Table III). The deviations from the ratio $X_1/P_1 = 1$, for the Census Divisions show a remarkable evenness in value, (last column of the table for the British Isles group in the Appendix). The highest deviations occur in Census Division 12 (0.53), and in Census Division 10 (0.31). These are the Census Divisions where the absence of persons of the British Isles group have already been noted. These areas are occupied by people of the Slavonic group mainly. Note that the deviations in these Census Divisions for the Slavonic group are 1.23 and 1.85 respectively, indicating a very high clustering or congregational tendency. An examination of the dot maps for these two groups confirms these patterns immediately. All the remaining Census Divisions show a deviation less than 0.30 for the British Isles group, indicating a very even mixture as compared with the other ethnic groups. This fact is difficult to assess from the dot maps alone. An examination

of the dot maps, when they are all laid out next to each other, would perhaps give an impression of even distribution of the British Isles group as compared with the other groups, to one observer, while another observer may see something entirely different. It is impossible to give a satisfactory description of the tendency of an ethnic group to cluster or congregate, as compared with other ethnic groups, from the dot maps alone. The quantitative measure is needed to differentiate numerically among the groups.

Population of German Origin

The German ethnic group is the second largest group in Alberta. There were 183,314 persons in this category in Alberta in 1961.¹² The Edmonton and Calgary metropolitan areas contain 71,767 persons of German origin. The other cities in Alberta together contain 18,398 persons of German descent. Thus a total of 90,165, or 49.3 per cent of all persons of German descent lived in the larger urban centers in Alberta in 1961.

¹² Austrians are not included in this category. They are incorporated with the category "Other European". The 1961 Census treats the Austrians separately. Although such a separate treatment does not conform with the guidelines for the Enumerator to establish the ethnic group to which a person belongs, which is essentially a linguistic one, the author tends to agree with such a separate treatment. The author is of the opinion that Austrians are not Germans. There were 15,904 Austrians in Alberta in 1961. This amounts to only 8.7 per cent of the number of persons of German descent. The author suspects furthermore that many persons of German descent reported themselves as being of Austrian descent for the same reasons explained in the section dealing with the distribution of the population of Dutch origin.

The Index of Concentration for this group, based on the Census Divisions is lower than the Index of Concentration for the British Isles group. This may indicate that the German group is more rural than the British Isles group. An examination of the populations in the larger urban centers reveals that a larger percentage of the British Isles origin group (59.7 per cent) lives in the urban centers than is the case for the German group (49.3 per cent). Census Division 6 and 11 contain a total of 52.1 per cent of persons of German origin. If the percentage for Calgary and Edmonton (39.1 per cent) is subtracted from 52.1 per cent, the remainder is 13 per cent, which may be considered predominantly rural. If the same is done for the British Isles group, a percentage of 8.9 is obtained, indicating that the Germans are more rural.

Typical concentrations of the German group, if the larger urban centers are excluded, occur in a strip of approximately 25 miles wide extending south of Edmonton to Ponoka; west of Edmonton, in particular around Stony Plain; southeast of Camrose, north of the Battle River; in the Three Hills area and south of this town; northeast of Edmonton, around Fort Saskatchewan and in the direction of Bruderheim; in the Raymond and Magrath area, and in the wedge formed by the boundary of the Province of Saskatchewan and the South Saskatchewan River.

The Census of 1901, (see table V) shows for the first time a substantial number of persons of German origin in Alberta. Between 1891 and 1894, after the completion of

the Edmonton-Calgary section of the railroad, some fourteen German settlements were established in the areas adjacent to the railroad. These settlements were placed in 1891 at Hoffnungen west of Leduc, and Rosenthal at the present site of Stony Plain west of Edmonton; in 1892 at Wetaskiwin; at Rabbit Hills, south of Edmonton; at Josephsburg, northeast of Edmonton; in 1893 at Leduc and at Dunbow southeast of Calgary; in 1894 at Bruderfeld on an abandoned Indian Reserve south of Edmonton; at Bruderheim in the neighborhood of Fort Saskatchewan; at Egg Lake north of Edmonton and west of Morinville; at Beaver Lake some 35 miles southeast of Edmonton; at Victoria some 40 miles northeast of Fort Saskatchewan in a very isolated position, and finally one in the immediate neighborhood of the railway, west of Lacombe.¹³

The main movement of the German speaking peoples to the Prairies, however, took place in the beginning of the twentieth century. The annual reports of the Department of Immigration and Colonization¹⁴ state, that over 64 per cent in the period 1907-1916 and over 80 per cent in the period 1922-1931 of the German speaking people who entered Canada gave one of the three prairie provinces as their destination.

TABLE V - POPULATION OF GERMAN ORIGIN FROM 1881 to 1961 in ALBERTA

Census Year	Population of German Origin	Total Population in Alberta	Per cent of German Origin Group to Total Population
1881	-	18,450*	-
1901	7,836	73,022	10.7
1911	36,862	374,295	9.9
1921	35,333	588,454	6.0
1931	74,450	731,605	10.2
1941	77,721	796,169	9.8
1951	107,985	939,501	11.5
1961	183,314	1,331,944	14.8
*Estimated			

Source: Compiled from the Canadian Censuses of the years shown.

¹³Morton, A. S., op. cit., p. 98.

¹⁴Annual Reports of the Department of Immigration and

In addition to the German speaking people from abroad, many came from the other provinces in Canada, especially from Ontario. Immigrants from abroad included not only those from almost every country in Europe, but those from the United States as well. Over 55 per cent of the total movement of German speaking peoples to the Canadian West in the period 1906 - 1911 came from the United States.¹⁵

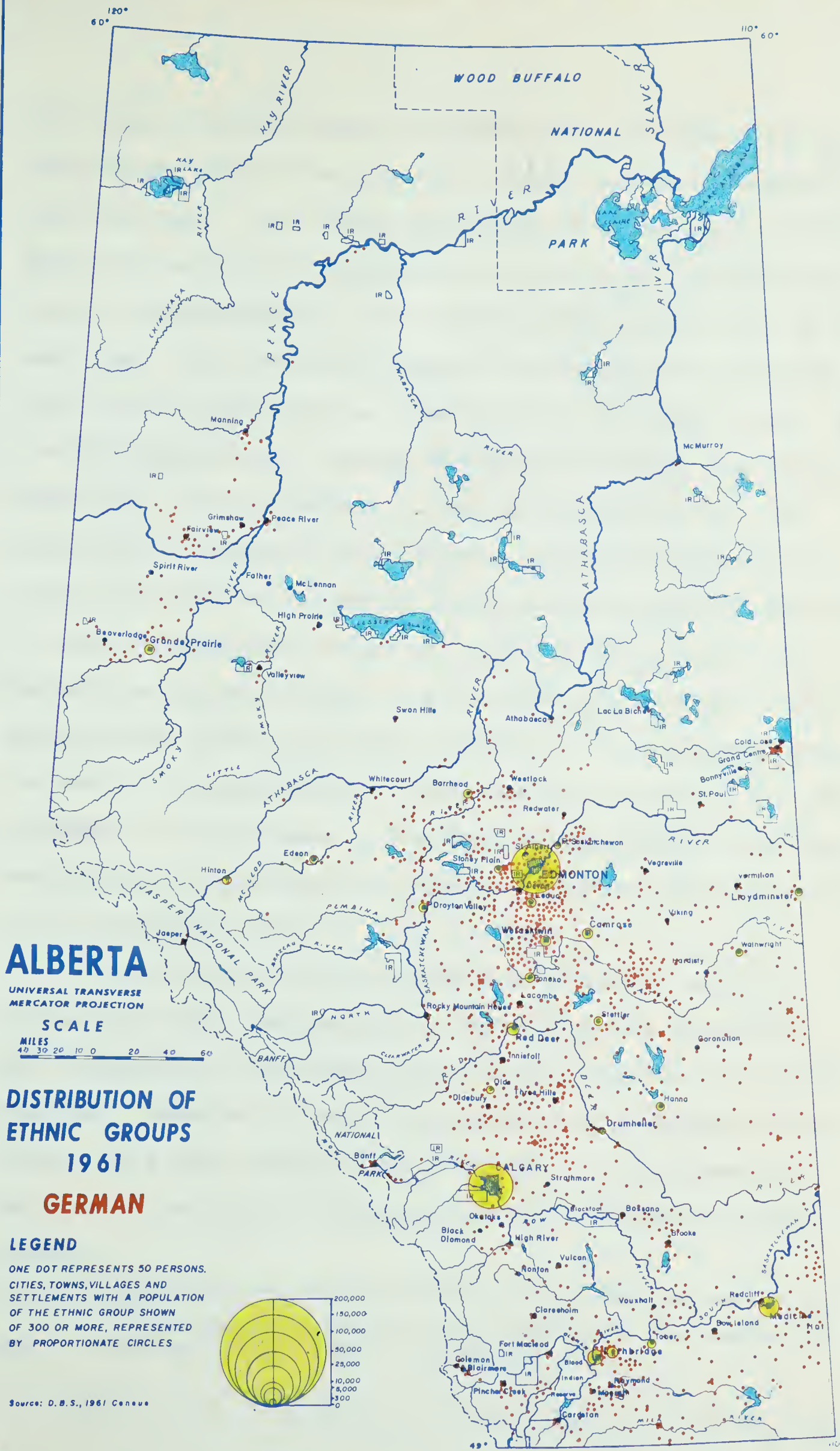
Many of the German speaking immigrants entering the prairies during this time came as groups, and settled as groups in colonies. Among them were such religiously oriented groups as the Mennonites, Hutterites and Catholic Germans.¹⁶

Table V shows a decrease of persons of German origin between the years 1911 and 1921 and between the years 1931 and 1941. It is suspected that during the World Wars, from 1914 to 1918 and from 1939 to 1945, many persons of German origin did not actually report themselves as such. These persons probably did not want themselves identified with Germany, a country with which Canada was at war.

A comparison of the maps showing "Foreign Groups in 1929", "Rural Population of German Origin in 1921" and "Distribution of Ethnic Groups, 1961, German", reveals a

¹⁵Ibid.

¹⁶It falls outside the scope of this study to deal with the religious aspects of these groups. See: Lester, J., The Distribution of Religious Groups in Alberta, 1961, unpublished M. Sc. thesis, Univ. of Alberta, Edmonton, 1966.



high degree of similarity in distribution patterns. In the Peace River region there exists a German group settlement near Fairview. This group settlement shows as early as 1921. (Each dot represents 25 persons on this map.) The 1961 map shows a concentration of the German origin group still in the same area. Note that all areas of concentration described above for the 1961 map can also be found on the 1921 map. They are the Edmonton and Calgary metropolitan areas, the Stony Plain area, the Bruderheim - Fort Saskatchewan area, the area south of Edmonton particularly around Wetaskiwin, the area just north of the Battle River and southeast of Camrose, the area around Three Hills and south of Three Hills, the Magrath and Raymond areas, and the area south of the South Saskatchewan River, near the boundary of Saskatchewan, which is part of a larger area of concentration extending into the Province of Saskatchewan. The Magrath and Raymond area concentration is predominantly settled by German speaking peoples of the Hutterite sect.¹⁷

Post World War II immigration of German speaking peoples has been considerable. Table VI shows that post-war immigration from abroad into Alberta amounted to 28,796 persons. Increase in the total population of German origin during this same period is much larger. The difference is made up by the natural increase and net - migration within Canada.

¹⁷ For the location of the colonies of the sects see map: "Foreign Groups 1929" on page 52.

MAP 8.

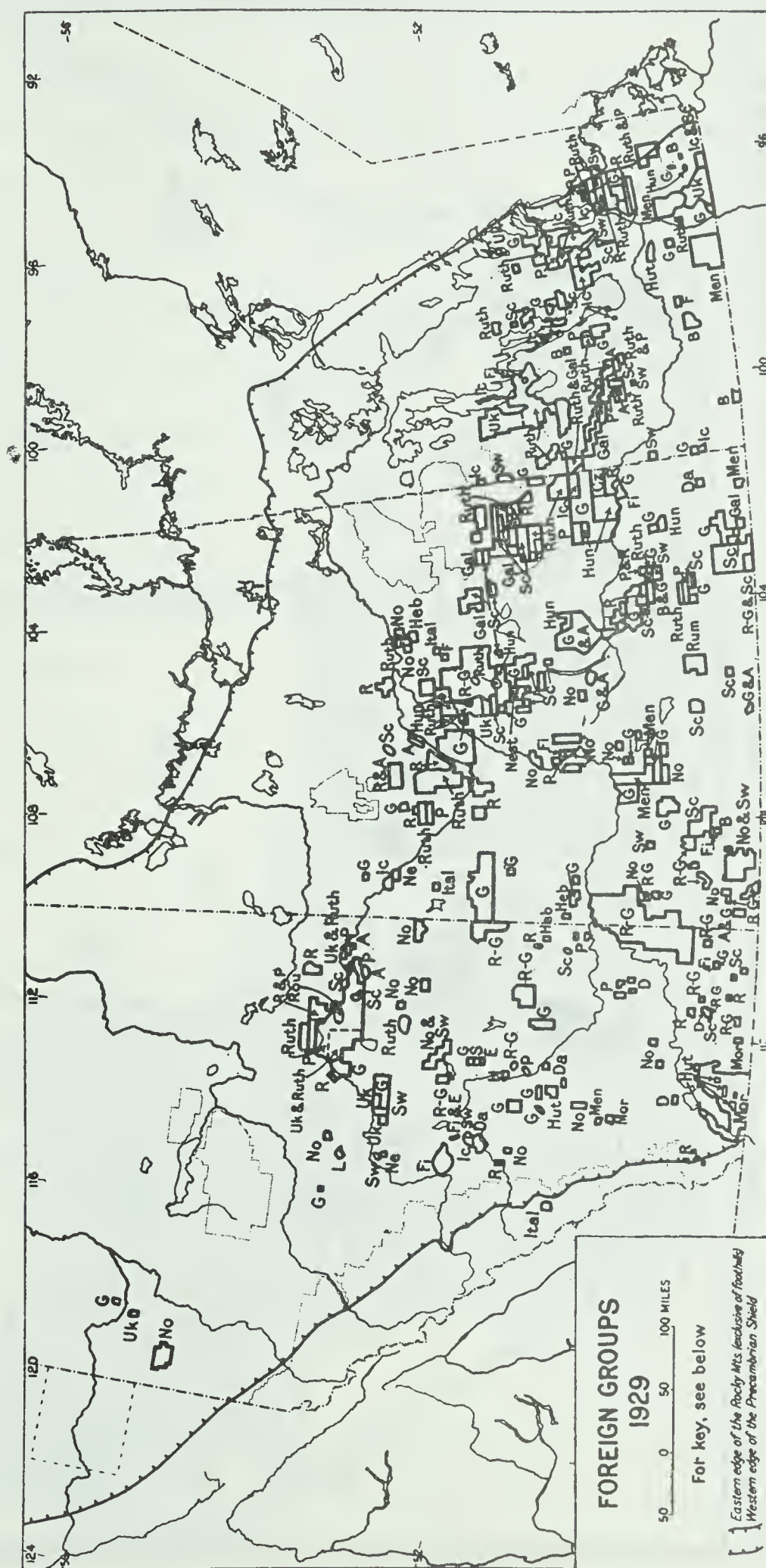


FIG. 1—Foreign groups, 1929. The areas outlined are those in which the groups still retain to some extent their old-world practices and languages. Key to symbols: A, Austrians; B, Belgians; Cz, Czechoslovaks; D, Danes; Da, Dutch; Da, Danes; E, Estonians; F, French; Fi, Finns; G, Germans; Gal, Galicians; Heb, Hebrews; Hun, Hungarians; Hut, Hutterites; Ic, Icelanders; Ital, Italians; L, Letts; Men, Mennonites; Mor, Mormons; Ne, Negroes; Nest, Nestorians ("Assyrians"); No, Norwegians; P, Poles; R, Russians; Rum, Rumanians; Ruth, Ruthenians; S, Swiss; Sw, Swedes; Sc, Scandinavians (undifferentiated); Uk, Ukrainians.

MAP 9.

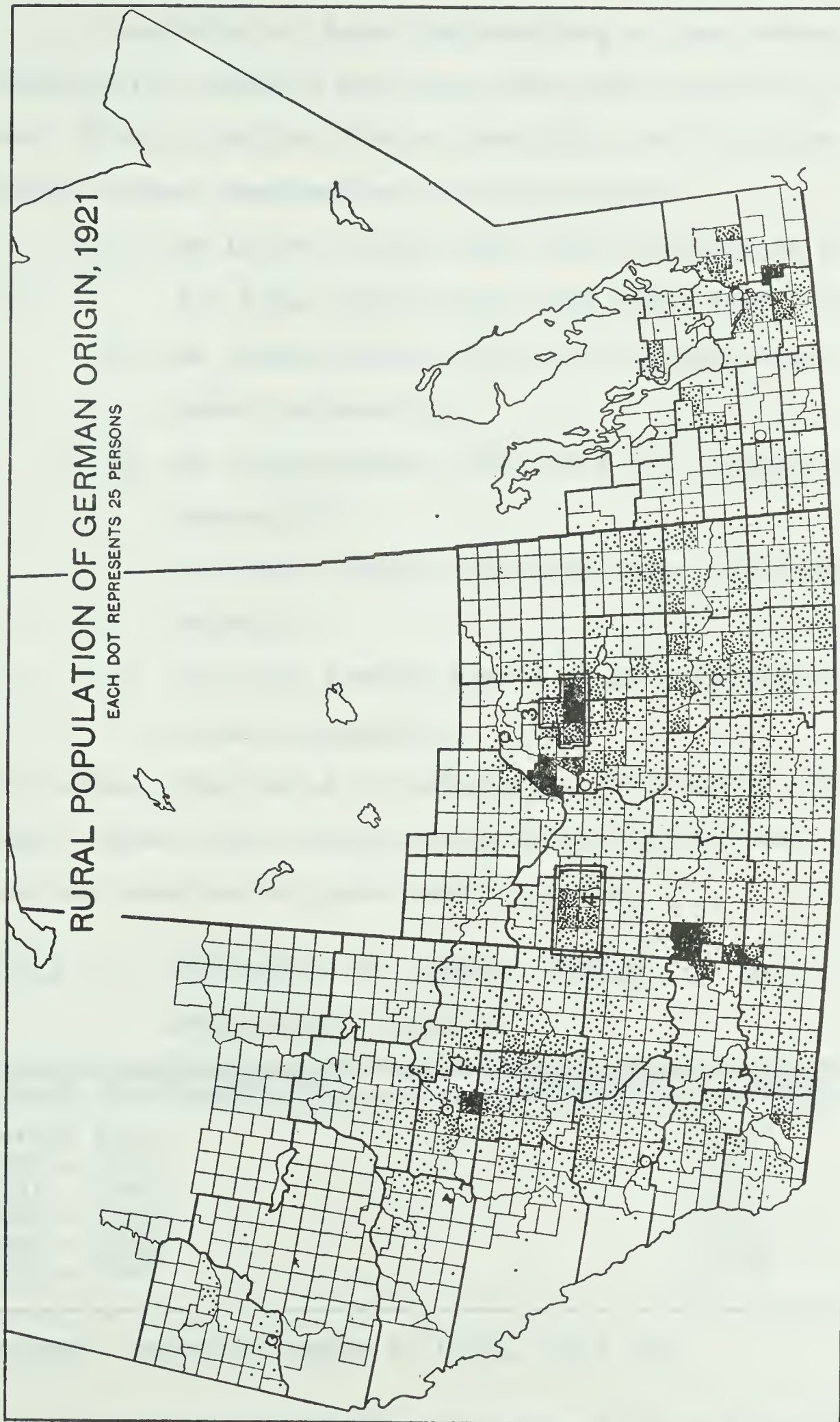


FIG. 48—Rural population of German origin, 1921 (*Statistical Atlas*). 3, St. Peter's colony; 4, St. Joseph's colony. Among the racial groups in the Prairie Provinces the Germans ranked second only to the Anglo-Saxons in numerical strength. There are relatively few concentrations among members of the group.

The Index of Areal Segregation for the German group, (Table III), compared with the other ethnic groups is fairly low. This is derived from a five-fold classification of the Index of Areal Segregation in groups where

1. An index of less than 0.30 indicates an extreme low areal segregation from other ethnic groups.
2. An index between 0.30 and 0.40 indicates a low areal segregation.
3. An index between 0.40 and 0.50 a medium areal segregation.
4. An index between 0.50 and 0.60 a high areal segregation.
5. An index greater than 0.60 an extremely high areal segregation.

The German group falls in category 1, a low areal segregation. Other ethnic groups which belong in the same class are the Scandinavian group and the Dutch.

TABLE VI - IMMIGRANTS OF GERMAN ORIGIN BY PERIOD OF IMMIGRATION, ALBERTA

Period of Immigration	Immigrants of German Origin
Before 1921	13,052
1921 - 1930	8,174
1931 - 1945	1,222
1946 - 1950	3,927
1951 - 1955	15,593
1956 - 1961	9,276

Source: Canadian Census of 1961, table 126.

The deviations from the ratio $X_1/P_1 = 1$ for the in-

dividual Census Divisions show the highest areal segregation in Census Division 1. This area does not contain many persons of German origin, if compared with some other areas in the province. Compared with the other ethnic groups however, the concentration of the German group in Census Division 1 is high.

Census Division 4 also has a fairly high Index of Areal Segregation for the German group. This phenomenon may be explained by the loss of a large segment of their population during the 1930's, when drought coincided with the economic depression. German group settlements, Catholic in Census Division 4 and Mennonite and Hutterite in Census Division 1, were in a better position to endure the crisis because they tended to be self reliant. The bulk of their agricultural produce was for consumption in the group. The cooperative nature of these settlements tended to make them less vulnerable to the economic crisis than the individual farmer who had to sell his crop on the market. The group settlements remained, and developed into a concentrated population pattern, consisting of people of the same ethnic background. Later expansion of the population in these areas, mostly after the last war, did not introduce very many new German immigrants, since most post - war immigrants settled individually, and mainly in the urban areas. The fact that the majority of the post - war immigrants flocked to urban centers, in harmony with the universal urbanization trend in the developed countries over approximately the last fifty

years, is perhaps the reason why the rural distribution patterns of all the ethnic groups have changed so little. The urban centers have absorbed a majority of the large number of the Germans in Alberta.

Population of Slavonic Origin

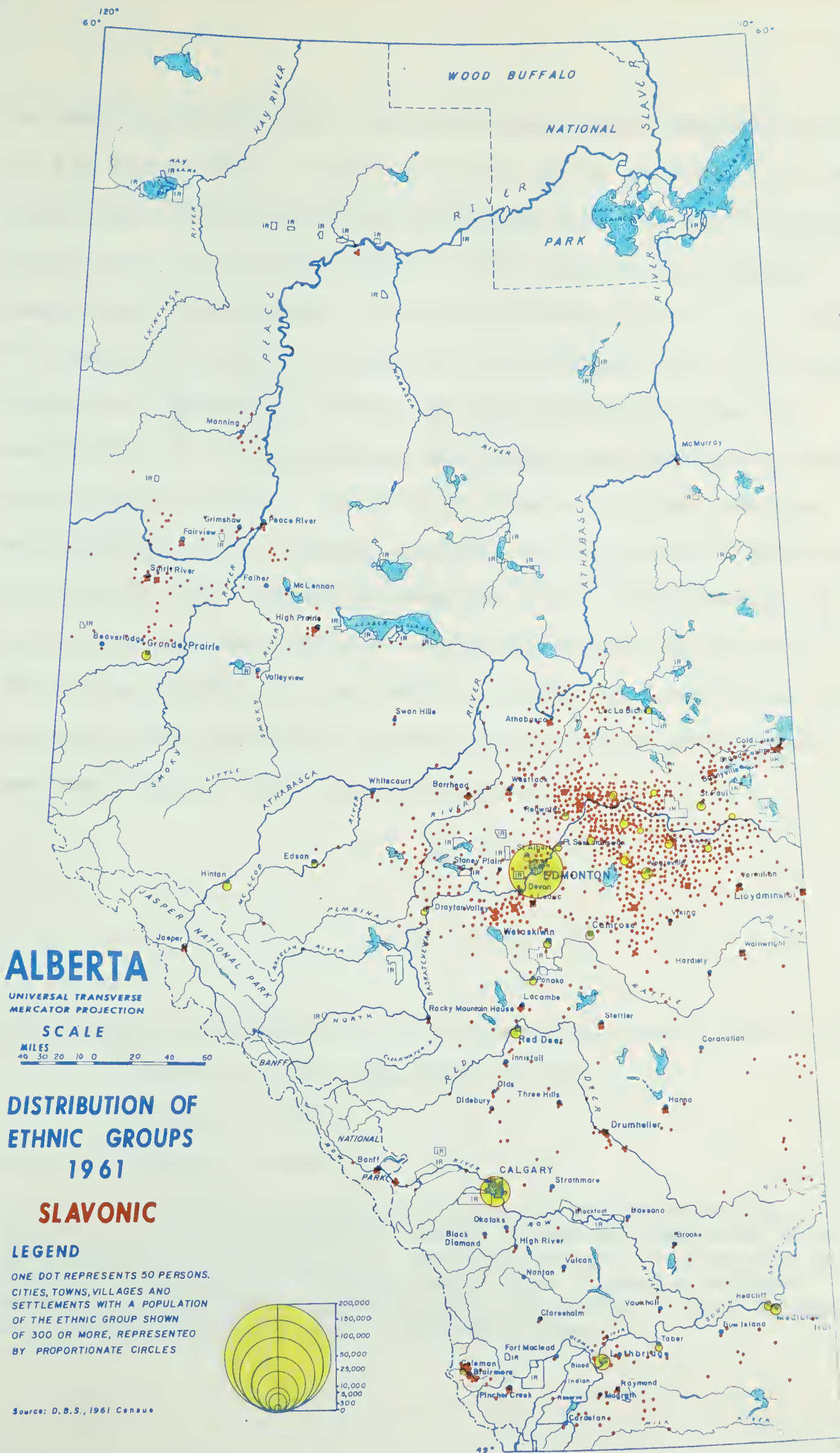
People of Slavonic origin formed the third largest group in Alberta. Ukrainians, Poles and Russians constituted the majority of peoples of Slavonic background in Alberta. There were 164,414 persons in this category in 1961. The Edmonton and Calgary metropolitan areas absorbed 71,387 persons of Slavonic origin, with Edmonton having the majority. The other cities in Alberta contained 7,696 persons of Slavonic origin. A total of 79,083, or 48.1 per cent of the people of Slavonic origin thus lived in the larger urban centers in Alberta.

The Index of Concentration for the Slavonic group, (61.22), is fairly high. It has been pointed out earlier that the nature of the distribution of the population of an ethnic group can affect the index considerably. The effect on the index, when large concentrations occur in Census Division 12 and 15, the large northern Census Divisions with little population, will be a decrease in value. The components of the Index of Concentration show that the largest concentrations of the Slavonic group occur in Census Divisions 6, 10 and 11. Census Division 6 and 11, Calgary and Edmonton, account for more than half of all persons of Slavonic origin.

Edmonton has 53,297 and Calgary 18,090 persons of Slavonic origin. The 1961 distribution map shows furthermore that the area east of Edmonton is almost exclusively populated by peoples of Slavonic origin. This area can be delineated fairly accurately. It is located within an encircling line which runs from Camrose east along Highway 13 to Daysland. From Daysland the line swings northeast to Viking, northwest to Bruce, north and east to Lavoy, follows Highway 16 east to the North Saskatchewan River at Heinsburg. From Heinsburg the line follows the course of the North Saskatchewan River upstream to the sharp bend in the river, just past Brasseau, skirts the west side of the Saddle Lake Indian Reserve until it reaches Ashmont, north of the Indian Reserve. From here the line runs west to Thorhild, swings south, via Redwater and the east boundary of Elk Island National Park to the east shore of Beaverhill Lake. The line from the east shore of Beaverhill Lake to Camrose closes the circle.

A second concentration of peoples of Slavonic origin centers on an axis which runs from Devon to Sunnybrook. Lesser concentrations occur north of St. Paul; in the Cold Lake - Grande Centre area; between Lac La Biche and Athabasca and south of this line; in the Peace River region around Spirit River, and in southern Alberta near Coleman and Blairmore. These are the main areas where large numbers of persons of Slavonic origin occur.

People of Slavonic origin were relatively late in arriving on the prairies, and especially in Alberta, as can



be seen from Table VII. With the building of the railroads in the period 1891 - 1901, the first Slavs to enter the then North West Territories were Galicians (not included in Table VII), who, in the period 1894 - 1895 settled at Limestone Lake, near the Edmonton - Calgary railroad line.¹⁸ In 1905 the Canadian Northern completed its railraod line via Lloydminster to Edmonton, opening up this northern region for settlement.¹⁹ It was during this time that peoples of Slavonic origin started to move into Alberta in great numbers, and settled in the country adjacent to this line on previous unoccupied land. From Innisfree west for approximately 66 miles the land was occupied predominantly by Ukrainians.²⁰ This area formed a nucleus which expanded in later years as more and more Ukrainians entered Alberta from Saskatchewan and Manitoba and directly from abroad.²¹

¹⁸ Morton, A. S., op. cit., p. 98.

¹⁹ Ibid., p. 121.

²⁰ Ibid., p. 122.

²¹ Among the peoples of Slavonic origin entering Alberta from the Province of Saskatchewan and Manitoba were the Doukhobors, members of a religious sect, originating in Russia. They form a minority among the Slavonic peoples however. In Alberta, a Doukhobor colony, the Cowley colony, is located in the Coleman - Blairmore area.

TABLE VII - POPULATION OF SLAVONIC ORIGIN FROM 1881 TO
1961 IN ALBERTA

Census Year	Population of Slavonic Origin	Total Population of Alberta	Per Cent Slavonic Origin to Total Population
1881	-	18,450+	-
1901	-	73,022	-
1911	2,243*	374,295	0.6
1921	7,172*	588,454	1.2
1931	93,410**	731,605	1.3
1941	118,029**	796,169	14.8
1951	131,971**	939,501	14.0
1961	164,414**	1,331,944	12.3

+Estimated

* Polish only

** Polish, Ukrainian and Russian only. Other Slavonic peoples included in the category "Other European".

Source: Compiled from the Canadian Censuses of the years shown.

The following map showing the rural population of Russian origin in 1921, and like the ethnic groups discussed so far, clearly delimits the skeletal population distribution patterns as they appear on the 1961 map for this group. The 1921 map includes Ukrainians but excludes Poles. The large influx of Ukrainians, who form the major group among the Slavs in the period 1911 - 1931 entering Alberta, were attracted to those areas where Ukrainian settlements were already established, i.e. the area east of Edmonton. Since Edmonton is the nearest major urban center, this city naturally attracted most of the people of Slavonic origin during the period of rapid urban growth.

The index of Areal Segregation as it is defined in the section dealing with the German group, shows a high degree

MAP 11.

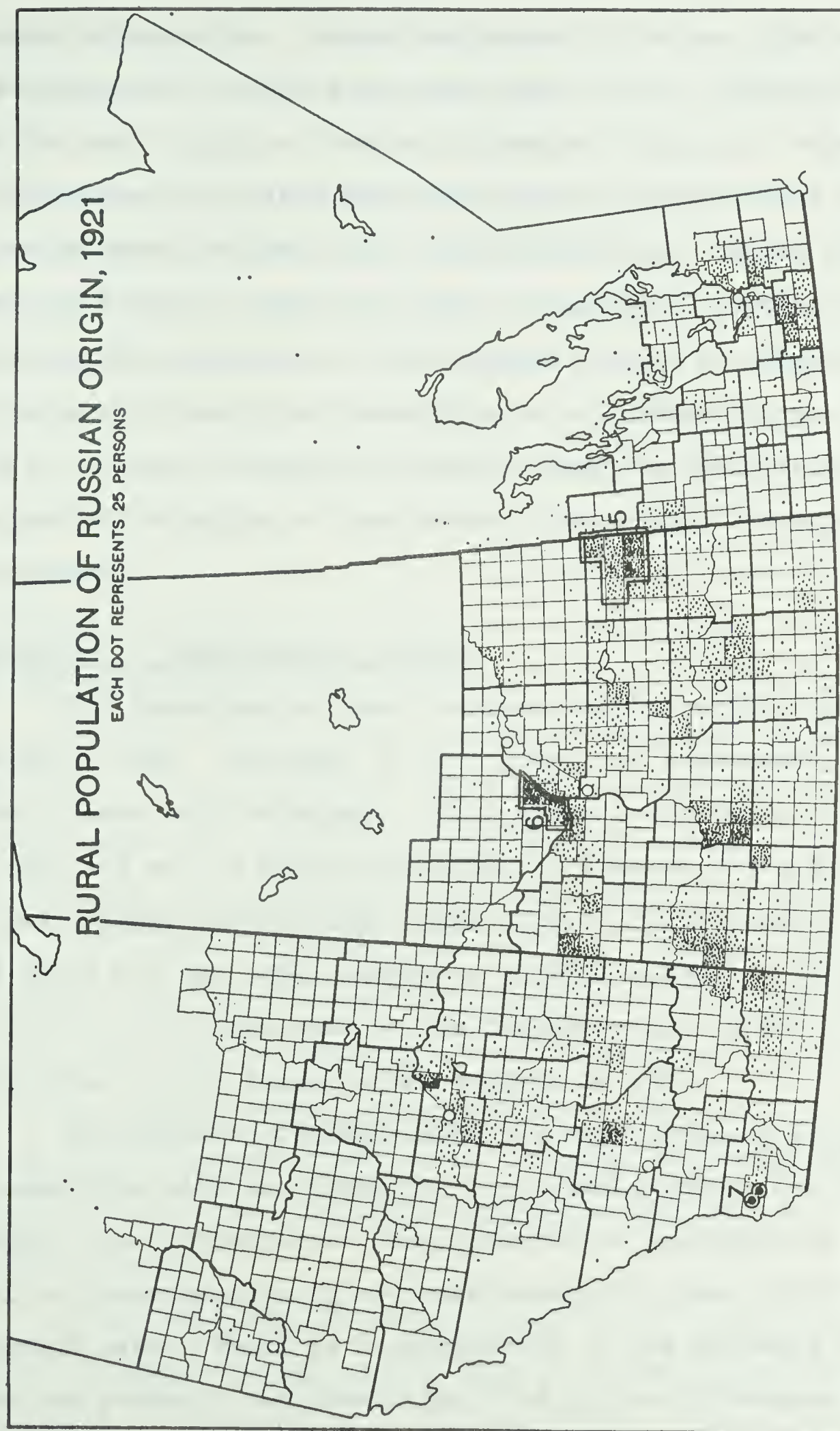


FIG. 4—Rural population of Russian origin, 1921; 5, North and South colonies (Yorkton-Swan River); 6, Saskatchewan colonies; 7, Cowley colony (based on map in *Agriculture, Climate, and Population of Prairie Provinces of Canada: A Statistical Atlas Showing Past Development and Present Condition*, prepared under the direction of W. Burton Hurd and T. W. Grindley, Dominion Bureau of Statistics, Ottawa, 1932—hereafter referred to as *Statistical Atlas*).

of areal segregation. Among the Census Divisions, (table in the Appendix), numbers Ten and Twelve show a deviation from the ratio $X_1/P_1 = 1$ which is greater than one. These are the Census Divisions where the major concentrations occur, as can be seen from the 1961 distribution map. Census Divisions 14, 4 and 11 have the lowest deviations. In these Census Divisions the proportion of the Slavonic group in Alberta matches most closely the proportion of all other ethnic groups. It can be expected therefore that in these areas the greatest mingling of the Slavonic group with the other groups occur.

Population of Scandinavian Origin

The Scandinavian group numbers 95,879 persons in Alberta in 1961. Included in this group are Norwegians, Swedes, Danes and Icelanders. This group constitutes only 7.2 per cent of the total population of Alberta. The Edmonton and Calgary metropolitan areas absorb 33,278 persons of this group and the other cities in Alberta 8,809. A total of 42,087 or 44.0 per cent of the Scandinavians in the province lived in the larger urban centers in 1961.

The Index of Concentration for this group at 61.34, is comparable with the index for the Slavonic group, (61.22). However, the similarity of the distribution indicated by the Index of Concentration is not corroborated by the 1961 distribution maps. There is no similarity in the patterns of these two groups. The reason for this is the difference in

the areas they occupy, and the difference in the degree of clustering the two groups exhibit. The components of the Index of Concentration show that the Slavonic group occupies different areas in different Census Divisions than the Scandinavian group. Census Division 11 demonstrates this well. The Slavonic group is heavily concentrated in this Census Division, (38.15 per cent of its total), while the Scandinavian group has 24.83 per cent of its total living in this Census Division. The result is a difference of 13.32 in favor of the Slavonic group for the value of $|X_i - Y_i|$ in the formula of the Index of Concentration. This extreme clustering of the Slavonic group in Census Division 11 has strongly affected its Index of Concentration. Clustering, or concentration of dots are conspicuous on a dot distribution map. It is the clustering of dots in Census Division 11 which makes the Slavonic group distribution stand out when compared with the distribution pattern of the Scandinavian group. It is this characteristic which is expressed quantitatively in the Index of Areal Segregation. An examination of this index for the two groups shows that they are quite far apart in their value, (see Table III). The Scandinavian group's Index of Areal Segregation is closer to the German, Dutch, Other and Other European categories than to the Slavonic group.

There are no particularly dense concentrations on the map for the Scandinavian group. Areas of modest concentration occur north of Beaverlodge in the Peace River region; in a

large area centered on Camrose and Wetaskiwin, and in a large area west of Red Deer. The remainder of the population of Scandinavian origin is spread all over the populated parts of the province, with concentrations in the urban centers.

Table VIII shows that the Scandinavian group constituted a fairly constant proportion of the total population of Alberta over the years given in the table. Again, like so many of the other ethnic groups, the great influx of persons of Scandinavian origin occurred during the railroad building period. In the period 1881 - 1911 the greatest percentage increase is evident. Between 1892 and 1896 some six Scandinavian settlements were established in the region adjacent to the Edmonton - Calgary railroad line. Scandinavians established themselves in 1892 near Lamont, in eight townships east of Wetaskiwin; near Olds on the railroad; in 1893 at Swea near Cygnet Lake west of Red Deer; in 1894 near Tofield, and in 1895 near Stony Plain.²² Other settlements can be located on the map showing "Foreign Groups, 1929".

TABLE VIII - POPULATION OF SCANDINAVIAN ORIGIN FROM 1881
TO 1961 IN ALBERTA

Census Year	Population of Scandinavian Origin	Total Population in Alberta	Per Cent of Scandinavian Origin to Total Population
1881	-	18,450*	-
1901	3,940	73,022	5.4
1911	28,046	374,295	7.5
1921	44,545	588,454	7.6
1931	59,461	731,605	8.1
1941	63,494	796,169	8.0
1951	70,929	939,501	7.5
1961	95,879	1,331,944	7.2
*Estimated			

Source: Compiled from the Canadian Censuses of the years shown.

²²Morton, A. S., op. cit., p. 98.

ALBERTA

UNIVERSAL TRANSVERSE
MERCATOR PROJECTION

SCALE

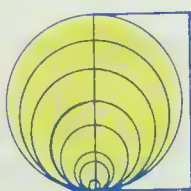


DISTRIBUTION OF ETHNIC GROUPS 1961

SCANDINAVIAN

LEGEND

ONE DOT REPRESENTS 50 PERSONS.
CITIES, TOWNS, VILLAGES AND
SETTLEMENTS WITH A POPULATION
OF 300 OR MORE, REPRESENTED
BY PROPORTIONATE CIRCLES



Source: D.B.S., 1961 Census



These original settlements spread out with the arrival of newcomers in the following years, and the expansion of the railroad net in Alberta. In the Peace River region of Alberta there were in 1901, 3,940 Scandinavians. In 1911 their number had increased to 29,634.²³ The map on page 52 shows a large Norwegian settlement in the Beaverlodge area.

Many of the Scandinavians came from the United States. In 1901, 919 Scandinavians out of a total of 1,491 migrated north across the border.²⁴ The westward movement of pioneers in the United States had slowed by this time, and the best land in the prairie regions of the United States had been taken up either for agriculture or for ranching. To the north, the Canadian prairies still had large tracts of land available for the willing pioneer. Railroad companies and private entrepreneurs advertised extensively in the United States for people to come out to the Canadian West and many responded. Among them were the many persons of British origin, but also Scandinavians. They settled mostly in the southern and central parts of Alberta.²⁵

The 1961 distribution map reflects the initial settlement patterns of the Scandinavian group. Those areas outlined in the beginning of this section as constituting a concentration for this group are the same areas in which the initial

²³Canadian Census of the years mentioned. These figures include persons of Finnish origin. Finns are not included in Table VIII.

²⁴Ibid., p. 128.

²⁵Hansen, M. L., The Mingling of the Canadian and American Peoples, New Haven: Yale Univ. Press, 1940, p. 220 ff.

settlements were located. For this group, like the other groups discussed so far, the initial settlements formed the nuclei to which new immigrants were attracted. The initial settlements, so far as they can be traced, were widely separated and can be found all over the populated areas of the province. It is perhaps for this reason that the 1961 distribution is widespread. From these nuclei, expansion took place, first at the boundaries of the settlements, and later to the urban areas in the province.

The Index of Areal Segregation as already mentioned, is low: 0.32, (see Table III). Census Divisions 10, 7 and 8 have the highest deviations from the ratio $X_i/P_i = 1$. It is in these Census Divisions that the largest concentration of the Scandinavian group occurs, as compared with all other ethnic groups.

Population of French Origin

The French origin group in Alberta numbered 83,319 persons in 1961. This was only 6.3 per cent of the total population in the province. The Edmonton and Calgary metropolitan areas absorbed 31,990 persons of French origin; the other cities in Alberta, 3,746 persons. A total of 35,736 or 47.9 per cent of the French origin group lived in the larger urban centers in 1961.

The Index of Concentration, based on the Census Divisions, for the French origin group is 47.24. This index is much lower than the index for the British Isles group, (64.69), or the German group, (63.04). An examination of the 1961

distribution maps shows that the French origin group is much more concentrated in certain localities than either the British Isles group or the German group. One would expect a group with such a low Index of Concentration to show a more even distribution over the whole territory of the province. This is not the case. It demonstrates the inadequacy of the Index of Concentration to measure the tendency of an ethnic group to form enclaves or to cluster. The low value of the Index of Concentration, in the case of the French, results from the fact that the concentrations of this group happen to occur in those Census Divisions which have very large areas, and which contain little population of other ethnic groups. Thus, for the two northern Census Divisions 12 and 15, which have 57.44 per cent of the total area of Alberta, and contain 27.90 per cent of the French origin group, the value of $|X_1 - Y_1|$ in the formula of the Index of Concentration is lower than for any other group, save the Indian and Eskimo group, which shows a similar distribution pattern.

Excepting the Calgary metropolitan area, the French origin group mostly lives in the northern half of the province. The areas of concentration are clearly delineated by the dot patterns on the map. The French areas are as follows: around St. Albert and north to Westlock; the Falher - McLennan area with a less dense extension north to the town of Peace River; the area south and west of Lac La Biche; the Cold Lake - Grande Centre area; the Bonnyville

area, and the St. Paul area with an extension north of St. Paul. Several other small areas of French concentration occur near Beaumont southeast of Edmonton; in the McMurray area; in a strip along Highway 2 south of Lesser Slave Lake, and in some smaller urban centers such as Drayton Valley, Edson, Hinton and Pincher Creek.

The percentage of the French speaking people compared to the total population in Alberta, (last column of Table IX), shows a remarkable uniformity over the years.

TABLE IX - POPULATION OF FRENCH ORIGIN FROM 1881 TO 1961
IN ALBERTA

Census Year	Population of French Origin	Total Population in Alberta	Per Cent of French Origin to Total Population
1881	1,150*	18,450*	6.2
1901	4,511	73,022	6.2
1911	19,792	374,295	5.3
1921	30,913	588,454	5.2
1931	38,377	731,605	5.2
1941	42,979	796,169	5.4
1951	56,185	939,501	6.0
1961	83,319	1,331,944	6.3

* Estimated

Source: Compiled from the Canadian Censuses of the years shown.

A slight dip in their proportion of the total population occurred from 1911 to 1931. It was during these years that the large influx of immigrants into Alberta occurred. By 1961, however, the French proportion of the total population again reached the value it had previous to the immigration rush. The uniformity of the percentage French in Alberta

ALBERTA

UNIVERSAL TRANSVERSE
MERCATOR PROJECTION

SCALE

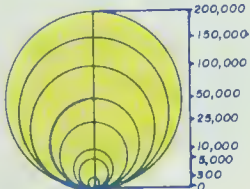


DISTRIBUTION OF ETHNIC GROUPS 1961

FRENCH

LEGEND

ONE DOT REPRESENTS 50 PERSONS.
CITIES, TOWNS, VILLAGES AND
SETTLEMENTS WITH A POPULATION
OF 300 OR MORE, REPRESENTED
BY PROPORTIONATE CIRCLES



Source: D.B.S., 1961 Census



through the years indicates that, in contrast with the Slavonic group, the German group and several other groups, the French inflow of immigrants was more gradual. There was no sudden rush of large numbers of immigrants of French origin into the province.²⁶

French settlement in Alberta is very closely linked with Roman Catholic missionary activity while Alberta was still part of the North West Territories. Missions formed nuclei around which settlement crystallized. As early as 1843, Father Thibault established a mission at Lac St. Anne, 40 miles west of Edmonton. Other missions were established by Father Rémas at Lac La Biche in 1853, and by Father Lacombe at St. Albert in 1861.²⁷ During this same period a mission was established at St. Paul.²⁸ These missions, originally established to serve the native Indian population, attracted métis, French fur traders and voyageurs, who were left stranded when the railroad reached their areas of operation.²⁹ In 1891 and 1892, Rev. J. B. Morin placed a colony of French settlers from Quebec immediately north of the existing missionary settlement of St.

²⁶ Dawson, C. A., "Group Settlement...", in Mackintosh and Joerg, op. cit., Vol. VII, p. 340.

²⁷ Moodie, D. W., The St. Albert Settlement: A Study in Historical Geography, unpublished M.A. thesis, Univ. of Alberta, Edmonton, 1965, pp. 27 ff. Morton, in "History of Prairie Settlement", op. cit., p. 61, quotes different dates for the establishment of missions. He dates the establishment of the mission at Lac St. Anne in the year 1844, and the missions at Lac La Biche and St. Albert in the year 1854. Since Moodie has documented his dates extensively and from reputable sources, the author is inclined to accept the latter.

²⁸ Dawson, op. cit., p. 341.

²⁹ Loc. cit.

Albert, at the present site of Morinville,³⁰ which was further extended northwards in later years.

The Beaumont area was settled by a group of thirteen French families in 1893, with the aid of the Catholic Church.³¹ The Church has been active among the French speaking settlers. Priests actively encouraged migration of French Catholic settlers from Quebec, France and the United States to the already established settlements. The original predominantly métis settlers,³² were displaced by new arrivals. The métis, who were less adept at farming, and in many cases not willing to settle down, were pushed out to unoccupied areas, at the fringes of settlement. These were the already existing Catholic missions farther north, such as at St. Paul, Lac La Biche, and later to the Peace River region, where at Grouard Mission, Guy and the area between Falher and McLennan concentrations of French developed.

The following map shows the distribution of rural population of French origin in 1926. The similarity of this map and the 1961 map is striking. It is quite clear that the pattern initially established in the beginning of the twentieth century still exists today, albeit in a more expanded form. The concentration of the French in the vicinity of Roman

³⁰Morton, op. cit., p. 98.

³¹Hull, V. L., A Geographic Study of the Impact of Two Ethnic Groups on the Rural Landscape in Central Alberta, Unpublished M.A. thesis, Univ. of Alberta, Edmonton, 1964, p. 32.

³²For an account of the role the métis played in the early history of Alberta, See: Moodie, op. cit., pp. 20 ff.

Catholic religious establishments is typical in the prairie regions. The Roman Catholic church seems to have maintained its influence among the French Canadians, in spite of the large influx of, and consequent exposure of the French to many people of other ethnic groups and other beliefs.

The Index of Areal Segregation is extremely high as would be expected for a group with such strong religious and social ties. The index is greater than 0.60, (Table III). Other ethnic groups falling in this class are the Italians and the Indian and Eskimo group. Again, as would be expected, the largest deviations from the ratio $X_i/P_i = 1$ occur in the northern Census Divisions 12 and 15.

Population of Dutch Origin

The total number of persons of Dutch origin in 1961 was 55,530, or only 4.2 per cent of the total population in Alberta. They constituted only a very minor group. The Edmonton and Calgary metropolitan areas absorbed 24,167 persons of Dutch origin, while the other cities absorbed another 4,660. A total of 28,827, or 52.0 per cent of the persons of Dutch origin lived in the larger urban centers in 1961. The majority of the Dutch people were thus urban dwellers.

The Index of Concentration at 64.36, (see Table II), is comparable with the indices for the British Isles group and the category Other European. Since the Edmonton and Calgary metropolitan areas contain some 44 per cent of the total Dutch population in Alberta, we can expect the Census Divisions which contain these cities to have the highest value

MAP 14.

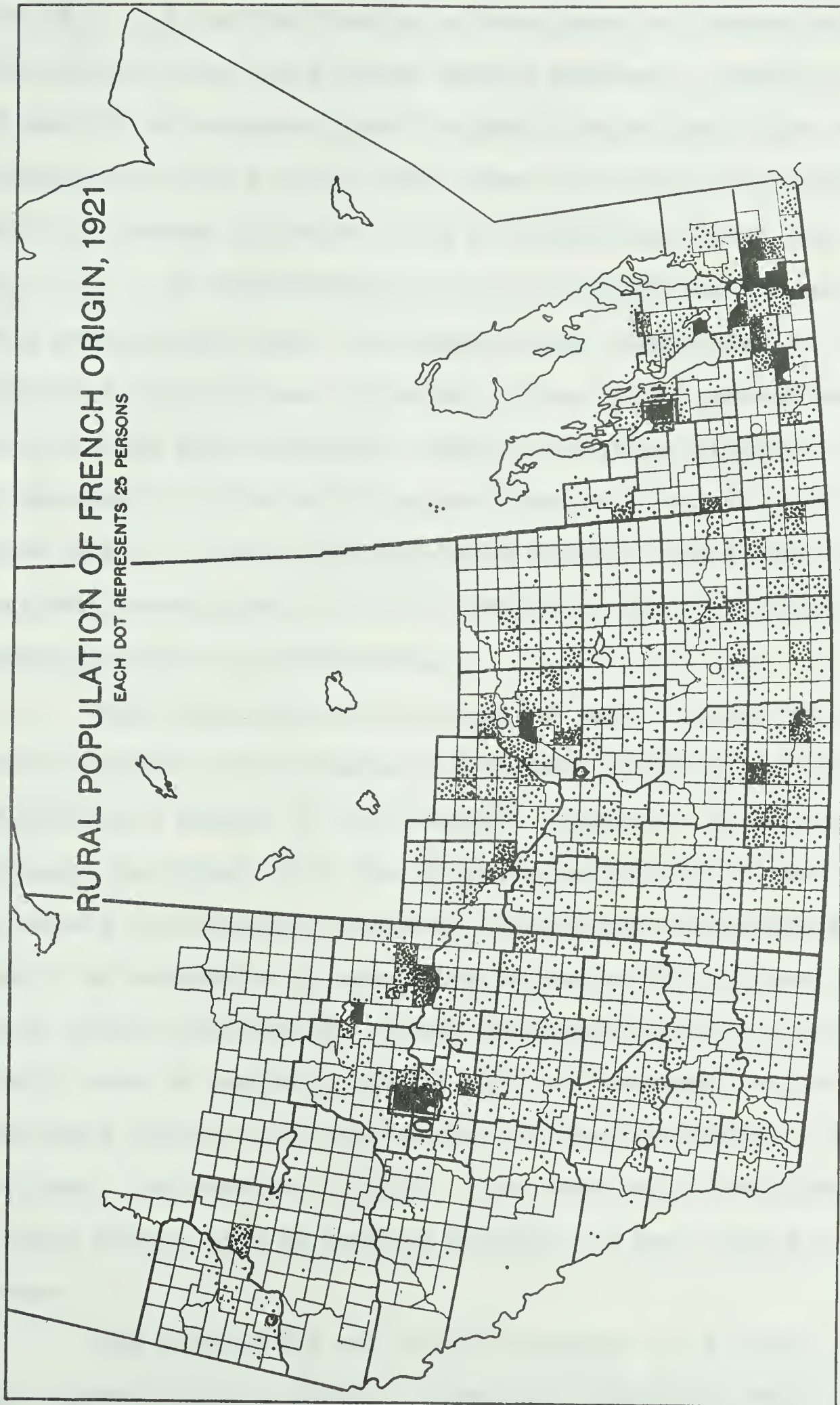


FIG. 65—Rural population of French origin, 1921 (*Statistical Atlas*). Persons of French racial origin constituted 6 per cent. of the population of the Prairie Provinces in 1926. The percentage Canadian-born (84 per cent.) was higher than that for the Anglo-Saxon group. (72 per cent. was rural.)

for $|X_1 - Y_1|$ in the formula of the Index of Concentration. They do not have the highest values however. Census Divisions 15 and 12, as expected, due to their large areas have values higher or a little lower than those for Census Divisions 6 and 11. Census Division 2 has a fairly high value for $|X_1 - Y_1|$. An examination of the 1961 distribution map for this group shows that the largest rural concentration is located in this Census Division. Other rural concentrations occur in the Fort Vermilion area in northern Alberta; north of Barrhead; in the Red Deer and Lacombe area, and south of Three Hills. Field investigations revealed that the concentrations around Fort Vermilion and south of Three Hills were entirely made up of Mennonites.

The Mennonite sect originated early in the sixteenth century during the Protestant Reformation when Menno Simons, originally a member of the Catholic clergy in Witmarsum, Holland, was drawn into the Protestant current of that time. He became an itinerant preacher in Holland and northern Germany. He succeeded in establishing bands of followers despite severe resistance. After his death in 1561, the sect slowly grew in numbers, and in 1632 the movement's doctrinal teachings became well established in the proclamation of the Dordrecht Confession of Faith. The sect was persecuted, and a great number of its members migrated to many parts of Europe.

The Mennonites who came to Canada in 1874 and 1875, were derived from a group of orthodox Mennonites who, via

Prussia, migrated to southern Russia prior to their migration to Canada. These Mennonites were German speaking when they arrived on this continent.³³ According to the 1961 Census definition these persons therefore ought to report themselves of German descent. It is obvious, however, that a great number of them reported themselves either of Dutch descent or of German descent, depending on the times. The sudden decrease in numbers of German descent at the Census of 1921 demonstrates this. In fact, most of the pre-second World War so called persons of Dutch origin were Mennonites.³⁴ That most of the true Dutch immigrants, i.e. persons from The Netherlands, arrived in Alberta after 1945, is also demonstrated by the figures in Tables XI and XII. These tables show a great disparity between the number of immigrants of Dutch origin and the number of immigrants speaking Dutch as their mother tongue prior to 1945, and also the close correlation in numbers of immigrants of Dutch origin with the number of persons speaking Dutch as their mother tongue, after 1945. How large a proportion of the Dutch origin group in 1961 belonged to the Mennonite sect, it is impossible to determine from the statistics.

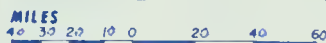
³³Aspects of the early history of the Mennonites from: Dawson, C.A., op. cit., pp. 95 ff.

³⁴Petersen, William, The Politics of Population, Doubleday & Company, Inc., Garden City, New York, 1964, p. 318.

ALBERTA

UNIVERSAL TRANSVERSE
MERCATOR PROJECTION

SCALE

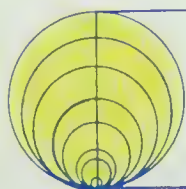


DISTRIBUTION OF ETHNIC GROUPS 1961

DUTCH

LEGEND

ONE DOT REPRESENTS 50 PERSONS.
CITIES, TOWNS, VILLAGES AND
SETTLEMENTS WITH A POPULATION
OF THE ETHNIC GROUP SHOWN
OF 300 OR MORE, REPRESENTED
BY PROPORTIONATE CIRCLES



Source: D.B.S., 1961 Census



TABLE X - POPULATION OF DUTCH ORIGIN FROM 1881 TO 1961
IN ALBERTA

Census Year	Population of Dutch Origin	Total Population in Alberta	Per Cent of Dutch Origin to Total Population
1881	1*	18,450*	-
1901	369	73,022	0.5
1911	2,951	374,295	0.8
1921	9,490	588,454	1.6
1931	13,665	731,605	1.9
1941	20,429	796,169	2.6
1951	29,385	939,501	3.1
1961	55,530	1,331,944	4.2
*Estimated			

Source: Compiled from the Canadian Censuses of the years shown.

TABLE XI - IMMIGRANT POPULATION OF DUTCH ORIGIN BY
PERIOD OF IMMIGRATION

Period of Immigration	Persons of Dutch Origin
Before 1921	2,150
1921 - 1930	1,743
1931 - 1945	308
1946 - 1950	3,019
1951 - 1955	10,461
1956 - 1961	5,614

Source: The 1961 Canadian Census, Table 126.

TABLE XII - IMMIGRANT POPULATION BY PERIOD OF IMMIGRATION
AND DUTCH MOTHER TONGUE

Period of Immigration	Persons Speaking Dutch as Their Mother Tongue
Before 1921	701
1921 - 1930	870
1931 - 1945	160
1946 - 1950	2,781
1951 - 1955	9,766
1956 - 1961	5,126

Source: The 1961 Canadian Census, Table 126.

Since there are no Mennonite colonies in the area just north of Barrhead, and the settlement where the concentration of dots occurs is called Neerlandia, it is presumed that this concentration is of true Dutch origin. The areas around Red Deer, Rocky Mountain House and in the urban fringes of Edmonton and Calgary are presumably also true Dutch, since no Mennonite colonies are found here. Inasmuch as Mennonites are agriculturalists, it is presumed that all the urban persons of Dutch origin shown on the map are persons from the Netherlands.

The Index of Areal Segregation for the Dutch group can be classified within the framework of references as outlined in the section dealing with the German group, as low, (see Table III). Other groups falling in this class are the German group, the Scandinavian group, and the categories Other European and Other. Census Division 2 shows the largest deviation from the ratio $X_1/P_1 = 1$. This means that the Dutch origin group, as defined by the Census, has a greater tendency to cluster or form enclaves in this Census Division than in any other Census Division. To what extent the Mennonites are affecting the indices for Alberta it is difficult to determine. The value of $|X_1 - Y_1|$ for Census Division 2, in the formula of the Index of Concentration would probably be lower if the Mennonites were excluded. It is unfortunate that the Canadian Censuses have not recognized the Mennonites as being of German origin rather than of Dutch origin. It makes any analysis of the distribution

MAP 16.

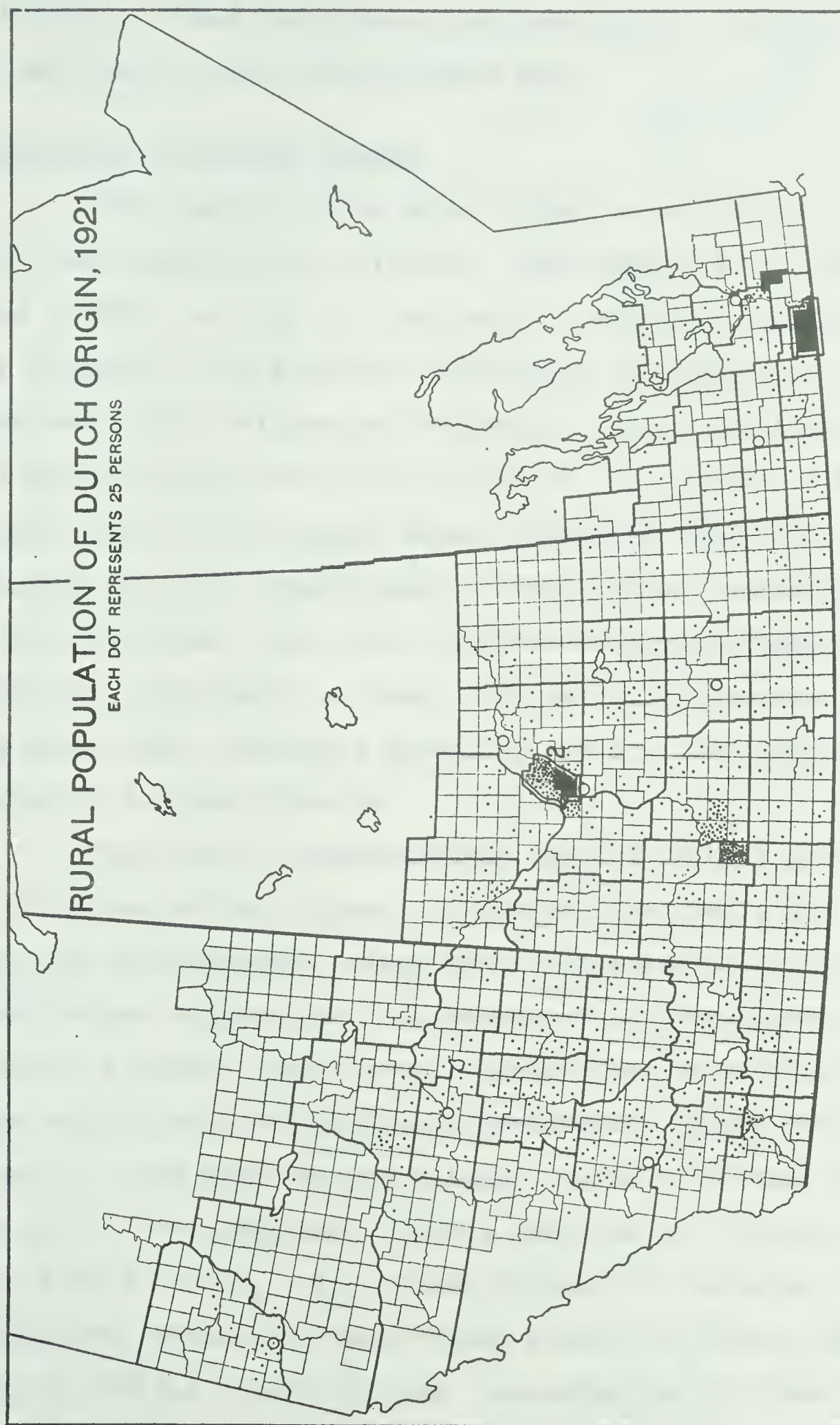


FIG. 16—Rural population of Dutch origin, 1921 (*Statistical Atlas*). Most of those classed as of Dutch origin are Mennonites. 1, Mennonite West Reserve; 2, Rosthern Mennonite Colony.

patterns of these two groups less meaningful. The same may be said for the 1961 distribution map.

Population of Italian Origin

The Italian origin group formed a very minor part of the total population in Alberta. They numbered 15,025 persons in 1961, or only 1.1 per cent of the total population of the province. The Edmonton and Calgary metropolitan areas absorbed 9,660 Italians and the other cities in Alberta 1,445. A total of 11,105, or 74.0 per cent of all persons of Italian origin lived in the larger urban centers in 1961. It is apparent that the greater part of the Italian population in Alberta is urban. The 1961 distribution map confirms this. There are practically no rural Italians in the province. The map shows that, excepting Edmonton, the Italians are concentrated in southern Alberta.

The Index of Concentration for the Italian group is at 70.87 one of the highest in the set, (see Table II). This can be understood, since most of the Italians live in Edmonton and Calgary, and the remainder is concentrated in southern Alberta. This is well exemplified by the percentage populations for the Census Divisions. Census Divisions 6 and 11, with Edmonton and Calgary, contain together 66.75 per cent of the Italians. Census Division 12, 15 and 9 have high values for $|X_i - Y_i|$ in the formula of the Index of Concentration, because of their large areas with little population of Italian origin in them. Accumulation of these high

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SCALE

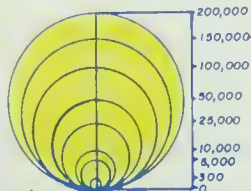
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DISTRIBUTION OF ETHNIC GROUPS 1961

ITALIAN

LEGEND

ONE DOT REPRESENTS 50 PERSONS.
CITIES, TOWNS, VILLAGES AND
SETTLEMENTS WITH A POPULATION
OF THE ETHNIC GROUP SHOWN
OF 300 OR MORE, REPRESENTED
BY PROPORTIONATE CIRCLES



Source: D. B. S., 1961 Census



values for $|X_1 - Y_1|$ of the individual Census Divisions give a high Index of Concentration for the whole province.

Table XIII shows that the Italians constituted less than one per cent of the population of Alberta up to the 1951 Census. Table XIV demonstrates that the majority of the Italian immigrants arrived after 1951. These immigrants were attracted to the major urban centers, where employment opportunities were greatest. There is a concentration of Italians in the coal mining center of Coleman.

TABLE XIII - POPULATION OF ITALIAN ORIGIN FROM 1881 TO 1961 IN ALBERTA

Census Year	Population of Italian Origin	Total Population in Alberta	Per Cent of Italian Origin to Total Population
1881	-	18,450*	-
1901	109	73,022	0.1
1911	2,139	374,295	0.6
1921	4,028	588,454	0.7
1931	4,766	731,605	0.7
1941	4,872	796,169	0.6
1951	5,996	939,501	0.6
1961	15,025	1,331,944	1.1

*Estimated

Source: Compiled from the Canadian Censuses of the years shown.

TABLE XIV - IMMIGRANT POPULATION OF ITALIAN ORIGIN BY PERIOD OF IMMIGRATION

Period of Immigration	Immigrants of Italian Origin
Before 1921	845
1921 - 1930	446
1931 - 1945	90
1946 - 1950	427
1951 - 1955	2,359
1956 - 1961	3,602

Source: The 1961 Canadian Census, Table 126.

The Index of Areal Segregation for this group is extremely high, (see Table III). The only other groups falling in this class are the French origin group and the Indian and Eskimo group. For the individual Census Divisions, Census Division 9 shows the highest deviation from the ratio $X_i/P_i = 1$. This is to be expected, since 8.9 per cent of the Italian population lives in this Census Division, while only 1.52 per cent of all other ethnic groups lives in this same Census Division. The greatest mingling of the Italian group with all other ethnic groups should be in Census Divisions 5, 11 and 14, since these Census Division show the lowest deviation from the ratio $X_i/P_i = 1$.

Population of Asiatic Origin

Like the Italian group, the Asiatic group formed a very minor part of the total population of Alberta. There were 12,503 persons of Asiatic origin, constituting a mere 0.9 per cent of the total population. The Edmonton and Calgary metropolitan areas absorbed 4,294 Asians, and the other cities in Alberta 1,835. A total of 6,129, or 51.0 per cent of all persons of Asiatic origin lived in the larger urban centers in 1961. The major groups represented in this category are the Chinese, which constituted 55.4 per cent, and the Japanese, which constituted 29.8 per cent of all Asians in Alberta in 1961.

The Index of Concentration for this group at 72.95, is the highest in the set. This is not surprising, since

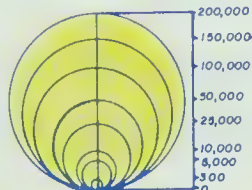


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ASIATIC

ONE DOT REPRESENTS 50 PERSONS.
CITIES, TOWNS, VILLAGES AND
SETTLEMENTS WITH A POPULATION
OF THE ETHNIC GROUP SHOWN
OF 300 OR MORE, REPRESENTED
BY PROPORTIONATE CIRCLES

Source: D. B. S., 1961 Census



26.13 per cent live in Census Division 6 and 25.81 per cent in Census Division 11. All other Census Divisions have less than four per cent of Asians living within their boundaries. The 1961 distribution map shows that the rural distribution of Asians occurs predominantly in the Lethbridge area; i.e. in Census Division 2. Table XV shows that the number of Asians in Alberta has been steadily climbing. An exception is the period after the depression years of the thirties. In this period an actual decline in numbers occurred which resulted in a slight dip in the percentage of this group to the total population of Alberta. In contrast with the Italian origin group, the period prior to 1921 saw a considerable number of immigrants of Asiatic origin in Alberta. These were predominantly Chinese.³⁵ It is well known that many Chinese were employed in the construction of the railroads. When the railroad building was finished, some of them settled in Alberta. Also well known is the fact of the forced "resettlement", for security reasons of persons of Japanese origin during World War II. These persons were "resettled" inland, away from the Pacific coast. After World War II, some of the Japanese remained in Alberta and settled predominantly near Lethbridge. This accounts for the concentration of persons of Asiatic origin in this area.

³⁵Canadian Census of 1901 and 1910.

TABLE XV - POPULATION OF ASIATIC ORIGIN FROM 1881 TO 1961
IN ALBERTA

Census Year	Population of Asiatic Origin in Alberta	Total Population in Alberta	Per cent of Asiatic Origin to Total Population
1881	-	18,450*	-
1901	248	73,022	0.3
1911	2,097	374,295	0.5
1921	4,298	588,454	0.7
1931	4,929	731,605	0.6
1941	4,204	796,169	0.5
1951	7,441	939,501	0.8
1961	12,503	1,331,944	0.9

*Estimated

Source: Compiled from the Canadian Censuses of the years shown.

TABLE XVI - IMMIGRANT POPULATION OF ASIATIC ORIGIN BY
PERIOD OF IMMIGRATION

Period of Immigration	Immigrants of Asiatic Origin
Before 1921	1,664
1921 - 1930	471
1931 - 1945	144
1946 - 1950	531
1951 - 1955	1,410
1956 - 1961	1,466

Source: The 1961 Canadian Census, Table 126.

The Index of Areal Segregation for this group is high. The highest deviation from the ratio $X_1/P_1 = 1$ occurs in Census Division 2. Here, 26.13 per cent of the Asiatic group live, while only 6.26 per cent of the other ethnic groups live in this Census Division. Census Division 6 and 11, containing the Edmonton and Calgary metropolitan areas, and Census Division 1, have the lowest deviations. These Census Divisions thus

have a proportion of Asiatics living in them close to the proportion of all other ethnic groups.

Indians and Eskimos

The Census classifies the native population under the heading "Indian and Eskimo". There may be a few Eskimos included in this group in Alberta, such as those who happen to be in the Camseil Hospital in Edmonton at the time the Census was taken, and perhaps a few others, but the majority in this group in Alberta are Indians and in this section they will be referred to as Indians.

There were 28,554 Indians in Alberta in 1961, more than at any time since the first Census was taken. Almost all Indians lived in the Indian Reserves in 1961. There were 720 Indians living in Edmonton and 411 in Calgary.

The Index of Concentration for this group is the lowest in the set, because the Indian Reserves, and thus the Indians living in them, are spread quite evenly over all fifteen Census Divisions. The 1961 distribution map shows this very well.³⁶

Displacement of the Indians by the European settler in Alberta has been very effective. A succession of treaties with the many Alberta tribes, such as the Blood, Blackfoot, Cree and Peigan, placed them on Reserves as the wards of the

³⁶Unfortunately, the two printing plates for the map of the Indian and Eskimo group did not register well during the printing process, resulting in a displacement of the dots to the northwest, which gives the impression that a considerable number of Indians are living outside their Reserves.



Crown, leaving the rest of the land open for settlement by European immigrants. The placement of the Indians on Reserves has effectively isolated them from the white man ever since.

TABLE XVII - POPULATION OF INDIAN ORIGIN FROM 1881 TO 1961 IN ALBERTA

Census Year	Population of Indian Origin	Total Population in Alberta	Per Cent of Indian Origin to Total Population
1881	16,239*	18,450*	88.0
1901	13,425	73,022	18.4
1911	11,402	374,295	3.2
1921	14,557	588,454	2.5
1931	15,252	731,605	2.1
1941	12,569	796,169	1.5
1951	21,210	939,501	2.3
1961	28,554	1,331,944	2.1

*Estimated

Source: Compiled from the Canadian Censuses of the years shown.

The great disparity between the Indian culture and the cultures of the Europeans, together with the physical isolation on the Reserves, has prevented their successful integration to this day. Of all the ethnic groups discussed, the Indians provide the clearest example of a group clustered in enclaves. They have been more or less forced to confine themselves to their Reserves.

The Index of Areal Segregation for this group has a value which is 0.69 above the next highest index in the set, that for the Italian group. The Indian group has the only Index of Areal Segregation greater than one. This indicates

that the tendency for this group to form enclaves, or for dots to cluster on a dot distribution map, is much higher than for any other group. Even a superficial examination of the 1961 distribution map confirms the extreme clustering that is indicated by the Index of Areal Segregation.

Persons Belonging in the Category "Other European"

Persons in the category Other European, refers to all Europeans not classified with the ethnic groups discussed in this study so far. They include Austrians, Czechs and Slovaks, Finns, Hungarians, Yugoslavs, Romanians, Greeks, Belgians, Lithuanians, Estonians, Moravians and Bulgarians. The Census grouped at various times several of these ethnic groups under one heading. Estonians for instance, were included with the Finns prior to 1951; Lithuanians and Moravians were included with the Hungarians in the Censuses of 1901 and 1911; Bulgarians were included with the Romanians in the Censuses of 1901 and 1911, and Finns and Poles were included with the Russians in the Censuses of 1871 and 1881.

TABLE XVIII - POPULATION OF "OTHER EUROPEAN" ORIGIN FROM
1881 TO 1961 IN ALBERTA

Census Year	Population of Other European Origin	Total Population in Alberta	Per Cent of Other European to Total Population
1881	571*+	18,450*	3.1
1901	7,328	73,022	10.0
1911	39,402	374,295	10.5
1921	79,300	588,454	13.5
1931	32,797	731,605	4.3
1941	38,174	796,169	4.8
1951	38,527	939,501	4.1
1961	72,274	1,331,944	5.4

*Estimated

+Includes "Others"

Source: Compiled from the Canadian Censuses of the years shown.

ALBERTA

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MERCATOR PROJECTION

SCALE

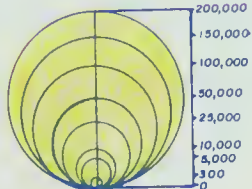


DISTRIBUTION OF ETHNIC GROUPS 1961

OTHER EUROPEANS

LEGEND

ONE DOT REPRESENTS 50 PERSONS.
CITIES, TOWNS, VILLAGES AND
SETTLEMENTS WITH A POPULATION
OF 300 OR MORE, REPRESENTED
BY PROPORTIONATE CIRCLES



Source: D.B.S., 1961 Census



To keep the tables showing the population of the different ethnic groups from 1881 to 1961 historically consistent, and consistent with the ethnic categories mapped, the ethnic tables for each Census were examined and the ethnic groups arranged into the groups presented in this study. This was not always possible, since at different times the Census grouped several ethnic groups together. Inconsistencies are indicated by the footnotes to the tables. The sudden decrease in the number of persons in the Other European category between 1921 and 1931 for instance, is caused by a reclassification of the Census in 1931 when the Ukrainians were included with the category Other European.

The category Other European constituted a fairly large proportion of the total population of Alberta in 1961. There were 72,274 persons in this category, making up 5.4 per cent of the total population of the province. The Edmonton and Calgary metropolitan areas absorbed 32,432 of them, and the other cities in Alberta another 6,966. A total of 39,398 or 54.5 per cent of the persons in this category were thus urban dwellers in 1961.

The Index of Concentration at 64.05 (see Table II), is comparable with the index for the British Isles and Dutch groups. When the components of the Index of Concentration are examined (see Table in the Appendix), it is noted that the largest concentrations for this group occur in Census Divisions 2, 6 and 11. These are the Census Divisions with the cities of Lethbridge, Calgary and Edmonton respectively. Another

concentration occurs in the Coleman - Blairmore area. Seale³⁷ points out that the Blairmore and Coleman area has a dominant population group which is foreign born. A large number of Czechs live in Frank and Blairmore and a large number of Slovaks in Bellevue. These people are working in the coal mines of the area, and they account for the concentration of dots in this area. Other rural concentrations occur around Lethbridge and Drumheller, between Red Deer and Rocky Mountain House, and northwest of Vegreville.

The Index of Areal Segregation for this group is fairly low, (see Table III). The index is comparable with the index of the German, Scandinavian and Dutch groups. The highest deviations from the ratio $X_i/P_i = 1$ occur in Census Divisions 2 and 9. It is in these Census Divisions that some clusters of dots occur. Although Census Division 11 has a high concentration of persons in this category, the deviation from the ratio $X_i/P_i = 1$ is very low. This indicates that in this Census Division persons in the category Other Europeans are nearly in the same proportion as all other ethnic groups.

The Category "Other"

This category has been included in the study for the sake of completeness. Persons in this category included Negroes, of which there were 1,307 in Alberta in 1961; persons who insisted that they were Canadian, of which there were

³⁷Seale, R. G., Some Geographical Aspects of the Coal Industry in Alberta, unpublished M.A. Thesis, Univ. of Alberta, Edmonton, 1966, pp. 207 and 208.



5,468,³⁸ and all other persons who did not know what to answer to the question concerning their ethnic descent, of which there were 8,249.

In 1961 there were a total of 15,024 persons in this category constituting a mere 1.1 per cent of the total population of the province. The Calgary and Edmonton metropolitan areas absorbed 6,495 of the persons belonging in this category, and the other cities 1,733. A total of 8,228 or 54.8 per cent of all persons in the category Other lived in the larger urban centers in Alberta in 1961. There was a negligible rural population in this category.

TABLE XIX - POPULATION OF "OTHER" ORIGIN FROM 1881 TO 1961 IN ALBERTA

Census Year	Population of "Other" Origin	Total Population in Alberta	Per Cent of Others to Total Population
1881	571*+	18,450*	3.1
1901	336	73,022	0.5
1911	35,246	374,295	9.0
1921	3,756	588,454	0.6
1931	1,538	731,605	0.2
1941	10,102	796,169	1.4
1951	14,228	939,501	1.5
1961	15,024	1,331,944	1.1

*Estimated

+Includes "Other European".

Source: Compiled from the Canadian Censuses of the years shown.

³⁸Personal communication with Mr. R. J. Davy, Chief, General Population Section, D.B.S., Ottawa, Aug. 12, 1965.

CHAPTER V

SUMMARY AND CONCLUSIONS

Introduction

The purpose of the study has been to determine (1) whether cultural ties among members of an ethnic group have been strong enough to influence, and give character to the distribution pattern of that group in the Province of Alberta; and (2) the extent to which a selected ethnic characteristic was evident in the distribution pattern of each ethnic group. The characteristic studied was the tendency of individual members of an ethnic group to live close to each other, and in so doing form enclaves, or clusters of dots on a dot distribution map.

The extent to which ethnic groups exhibit this characteristic was difficult to determine from the dot maps alone. The majority of the dot distribution patterns on the maps exhibited differences too subtle to enable clear differentiation of the selected characteristic among the groups. The quantitative methods used in the study expressed the characteristic numerically, and made differentiation of groups possible. The meaning of the indices, as they were applied in this study could then be evaluated. The meaning could

best be demonstrated by selecting as examples the group which showed the greatest tendency to cluster, and the group which showed the least tendency to do so. They were the Indian and Eskimo group and the British Isles group. These two groups exhibited the selected characteristic to the extreme at either end of the scale. The tendency or failure to cluster could even be distinguished on the maps. It is from these groups that an insight in the meaning of the indices could be obtained.

The Indian and Eskimo group had an Index of Concentration of 29.15, the lowest of the set, while the Index of Areal Segregation was 1.48, the highest in the set. When the map showing the distribution of the Indian and Eskimo group was examined, the meaning of these values became clear. The map showed that the Indian and Eskimo population was quite evenly divided over all fifteen Census Divisions, but the clustering which this group exhibited was extreme, since the majority of the members of this group were living on the Indian Reserves. In other words, clusters of dots, or concentrations of Indians and Eskimos could be found all over the province.

The Index of Concentration for the British Isles group at 64.69, was one of the highest in the set, while this group's Index of Areal Segregation at 0.16, was the lowest in the set. This situation was the reverse of that of the Indian and Eskimo group. One would therefore expect

a reverse situation in the distribution pattern characteristics for the British Isles group, when compared with that of the Indian and Eskimo group. An examination of the maps showing the distribution of these groups confirmed the reversal of characteristics. The British Isles group showed a general lack of clustering. The majority of the population of British Isles origin, furthermore, was evenly distributed over the central and southern parts of the province, while in the northern half of the province a comparative lack of population of British Isles origin was observed.

These two examples demonstrate that the indices have a definite meaning and can be used in defining population distribution characteristics. The indices become especially useful in those cases where differences in population distribution patterns become so subtle as to be undistinguishable on a dot distribution map.

Conclusions

1. "Areal association or segregation of groups of phenomena occupying the same area can be evaluated in terms of numerical values, represented by the Index of Areal Segregation".
2. "Cultural ties among individual members of some ethnic groups have been strong enough to influence their distribution pattern in Alberta".

The strength of ties among members of an ethnic group is determined by numerous factors. There are two factors which seem to stand out more than any others as being of major importance in the determination of ethnic cohesiveness. These

are religion and language. Of these two factors, a common language is probably the more influential one. If a certain ethnic group has not only a common language, but also a common religion, the ties between the individual members become even stronger.

The two ethnic groups of European origin which showed the strongest tendencies to segregate areally from other groups were the Italian and the French. The majority of the members of these two groups had not only a common language, but a common religion as well; both groups were predominantly Roman Catholic. Of the 83,319 persons of French origin, 63,519, or 76.3 per cent were Roman Catholic in 1961.¹ Of the 15,025 persons of Italian origin, 12,697, or 84.6 per cent were Roman Catholic.²

The group which showed the least tendency to segregate areally from other groups was the British Isles origin group. Persons of British Isles origin formed the majority in Alberta. The whole Canadian system of government, including the judiciary, is of British origin. One of two official languages spoken in this country is English. In Alberta English is the only universally spoken language. It is therefore not surprising that the British Isles origin group showed the least tendency to segregate, since there was no need for them to do so in order to preserve their cultural

¹The 1961 Canadian Census, Table 111.

²Loc. cit.

heritage.

The other ethnic groups fall between the two extremes in their tendency to segregate from each other.

The Indian and Eskimo group had to be treated separately. This group had a cultural heritage which was displaced by the European cultures. Their culture became endemic within the fabric of imported cultures, and retreated to the enclaves of the Indian Reserves. It was to be expected therefore that the tendency to segregate areally, which was a forced one, was the greatest for this group. The distribution patterns for the groups that showed the strongest tendencies to segregate were very much in evidence. On the dot distribution maps these groups showed a greater degree of clustering than the other ethnic groups.

3. "The extent to which areal segregation of ethnic groups has taken place can be quantitatively expressed. If so expressed, and properly arranged, the values obtained form a hierarchy which is related to the characteristics of clustering of dots on the distribution maps".

If the ethnic groups with the value of their indices of areal segregation are re-arranged in ascending order, they can be placed in classes which have similar distribution characteristics, (Table XVIII).

Class I contains only one ethnic group: The British Isles group. The population of British Isles origin showed a more even distribution within the inhabited parts of the province than any other group. The group had the lowest Index of Areal Segregation, and there was no area in Alberta exclusively British.

Class II contains the Scandinavian, Dutch and German groups. The characteristics of the distribution patterns of this class were most difficult to assess. They were intermediate between no areal segregation and high areal segregation. The maps showed some tendency of dots to cluster, especially for the German and Dutch groups.

TABLE XX - RELATIONSHIPS BETWEEN THE INDEX OF AREAL SEGREGATION AND POPULATION DISTRIBUTION CHARACTERISTICS

Class Number	Ethnic Group	Index of Areal Segregation	Typical Characteristics of Distribution Pattern
I	British Isles	0.16	No area exclusively British. Distribution pattern, within inhabited areas, more even than any other group.
II	Scandinavian	0.32	Some concentration in particular areas evident. Remainder similar to British Isles group distribution pattern.
	Dutch	0.34	
	German	0.36	
III	Slavonic	0.55	Clustering of dots in evidence. One area exclusively Slavonic.
	Asiatic	0.57	
IV	French	0.66	Areal segregation extremely high. Existence of enclaves of exclusively French or Italian population.
	Italian	0.79	
V	Indian & Eskimo	1.48	Highest degree of areal segregation. Clusters of dots exclusively on Indian Reserves.

Class III contains the Slavonic and Asiatic origin groups. This class had high areal segregational tendencies, which began to show on the distribution maps. The Slavonic group for instance occupied the area east of Edmonton almost exclusively, as outlined in the section dealing with this group. Other areas of concentration of dots for this group contained other ethnic groups as well, and were not exclusively Slavonic. The Asiatic group consisted of more than one ethnic group. The tendency for this group to cluster, however, was quite evident in southern Alberta.

Class IV contains the Italian and French groups. They showed an extreme high tendency to cluster. This tendency was high enough to form enclaves, especially for the French group. These two groups could have been separated to form separate classes on the basis of their Indices of Areal Segregation. The value of their indices are far enough apart to justify the creation of a separate class. It was felt, however, that the two groups showed distribution characteristics more closely related to each other, than to any of the other groups. They were thus placed in one class.

Class V, containing the Indian and Eskimo group, showed a pattern of distribution with a maximum conglomeration of dots, exclusively on the Indian Reserves.

Individuals who prefer to live near others with the same cultural background and speaking the same language, do so because they do not feel at home among people who have a different cultural background and who speak a different

language. The tendency of individuals to live close to each other because of their common cultural background can be interpreted as a manifestation of difficulty in assimilating. If we accept the premise that the tendency of individual members of an ethnic group to live close to each other is indicative of the degree to which the group as a whole has integrated in society as it exists around them, then the Index of Areal Segregation becomes a measure of social integration for the group under consideration.

The final conclusion based on the above is that,

4. "The Index of Areal Segregation can be used as a measure of the degree to which social integration of ethnic groups has taken place".

The classes of Table XX, therefore, do not only show similar distribution characteristics for the ethnic groups in the classes, but they are also indicative of the degree to which the groups have integrated up to 1961. The ethnic groups in Class II integrated to the greatest extent, while the group in Class V did so to the least extent.

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TABLE 2. Comparison of the two sets of regression coefficients for the two sets of data.

Variable	Set 1		Set 2	
	Regression coefficient	Standard error	Regression coefficient	Standard error
Intercept	1.00	0.05	1.00	0.05
Age	0.02	0.01	0.02	0.01
Gender	0.01	0.01	0.01	0.01
Education	0.01	0.01	0.01	0.01
Income	0.01	0.01	0.01	0.01
Health	0.01	0.01	0.01	0.01
Marital status	0.01	0.01	0.01	0.01
Religion	0.01	0.01	0.01	0.01
Occupation	0.01	0.01	0.01	0.01
Region	0.01	0.01	0.01	0.01
Time	0.01	0.01	0.01	0.01

APPENDIX

The following table contains the regression coefficients for the two sets of data.

TABLE 1 - COMPONENTS OF THE INDEX OF CONCENTRATION, ALBERTA,
1961.

Ethnic Group: British Isles.			
Census Division	Y_i Per cent Area	X_i Per cent Population	$ X_i - Y_i $
1	3.25	2.35	0.90
2	2.81	5.45	2.64
3	1.93	2.52	0.59
4	3.41	1.17	2.24
5	2.60	2.94	0.34
6	2.00	30.36	28.36
7	3.05	3.32	0.27
8	2.27	6.96	4.69
9	7.14	1.47	5.64
10	3.28	3.64	0.36
11	2.24	30.06	27.82
12	20.19	1.65	18.54
13	3.77	2.39	1.38
14	4.81	1.30	3.51
15	37.25	4.42	32.83
	100.00	100.00	129.38

The Index of Concentration is $129.38/2 = 64.69$

TABLE 2 - COMPONENTS OF THE INDEX OF CONCENTRATION, ALBERTA,
1961.

<u>Ethnic Group: German</u>			
Census Division	Y_i Per cent Area	X_i Per cent Population	$ X_i - Y_i $
1	3.25	7.64	4.39
2	2.81	7.00	4.19
3	1.93	2.04	0.11
4	3.41	1.94	1.47
5	2.60	3.47	0.87
6	2.00	20.50	18.50
7	3.05	4.47	1.42
8	2.27	5.13	2.86
9	7.14	0.82	6.32
10	3.28	4.23	0.95
11	2.24	31.60	29.36
12	20.19	1.10	19.09
13	3.77	4.16	0.39
14	4.81	1.54	3.27
15	37.25	4.36	32.89
	<u>100.00</u>	<u>100.00</u>	<u>126.08</u>

The Index of Concentration is $126.08/2 = 63.04$

TABLE 3 - COMPONENTS OF THE INDEX OF CONCENTRATION, ALBERTA,
1961.

<u>Ethnic Group: French</u>			
Census Division	Y_i Per cent Area	X_i Per cent Population	$ X_i - Y_i $
1	3.25	1.14	2.11
2	2.81	2.28	0.53
3	1.93	1.38	0.55
4	3.41	0.48	2.93
5	2.60	1.67	0.93
6	2.00	14.95	12.95
7	3.05	2.25	0.80
8	2.27	3.42	1.15
9	7.14	0.95	6.19
10	3.28	2.38	0.90
11	2.24	34.60	32.36
12	20.19	14.00	6.19
13	3.77	4.55	0.78
14	4.81	2.05	2.76
15	37.25	13.90	23.35
	<u>100.00</u>	<u>100.00</u>	<u>94.48</u>

The Index of Concentration is $94.48/2 = 47.24$

TABLE 4 - COMPONENTS OF THE INDEX OF CONCENTRATION, ALBERTA,
1961.

<u>Ethnic Group: Slavonic</u>			
Census Division	Y_i Per cent Area	X_i Per cent Population	$ X_i - Y_i $
1	3.25	1.94	1.31
2	2.81	3.60	0.79
3	1.93	0.91	1.02
4	3.41	1.00	2.41
5	2.60	1.51	1.09
6	2.00	11.98	9.98
7	3.05	1.51	1.54
8	2.27	2.12	0.15
9	7.14	1.22	5.92
10	3.28	14.98	11.70
11	2.24	38.15	35.91
12	20.19	7.91	12.28
13	3.77	6.61	2.84
14	4.81	1.50	3.31
15	37.25	5.06	32.19
	<u>100.00</u>	<u>100.00</u>	<u>122.44</u>

The Index of Concentration is $122.44/2 = 61.22$

TABLE 5 - COMPONENTS OF THE INDEX OF CONCENTRATION, ALBERTA,
1961.

<u>Ethnic Group: Scandinavian</u>			
Census Division	Y_i Per cent Area	X_i Per cent Population	$ X_i - Y_i $
1	3.25	2.40	0.85
2	2.81	6.86	4.05
3	1.93	2.94	1.01
4	3.41	1.57	1.84
5	2.60	3.95	1.35
6	2.00	20.01	18.01
7	3.05	5.39	2.34
8	2.27	8.59	6.32
9	7.14	1.04	6.10
10	3.28	8.95	5.67
11	2.24	24.83	22.59
12	20.19	2.06	18.13
13	3.77	3.02	0.75
14	4.81	1.72	3.09
15	37.25	6.67	30.58
	<u>100.00</u>	<u>100.00</u>	<u>122.68</u>

The Index of Concentration is $122.68/2 = 61.34$

TABLE 6 - COMPONENTS OF THE INDEX OF CONCENTRATION, ALBERTA,
1961.

<u>Ethnic Group: Dutch</u>			
Census Division	Y_1 Per cent Area	X_1 Per cent Population	$ X_1 - Y_1 $
1	3.25	2.39	0.86
2	2.81	12.85	10.04
3	1.93	2.16	0.23
4	3.41	0.62	2.79
5	2.60	3.60	1.00
6	2.00	23.44	21.44
7	3.05	2.08	0.97
8	2.27	6.96	4.69
9	7.14	0.85	6.29
10	3.28	2.47	0.81
11	2.24	29.20	26.96
12	20.19	0.81	19.38
13	3.77	2.84	0.93
14	4.81	1.63	3.18
15	37.25	8.10	29.15
	<u>100.00</u>	<u>100.00</u>	<u>128.72</u>

The Index of Concentration is $128.72/2 = 64.36$

TABLE 7 - COMPONENTS OF THE INDEX OF CONCENTRATION, ALBERTA,
1961.

<u>Ethnic Group: Italian</u>			
Census Division	Y_i Per cent Area	X_i Per cent Population	$ X_i - Y_i $
1	3.25	1.93	1.32
2	2.81	9.24	6.43
3	1.93	1.17	0.76
4	3.41	0.08	3.33
5	2.60	2.77	0.17
6	2.00	34.18	32.18
7	3.05	0.56	2.49
8	2.27	2.23	0.04
9	7.14	8.90	1.76
10	3.28	0.41	2.87
11	2.24	32.57	30.33
12	20.19	1.87	18.32
13	3.77	1.34	2.43
14	4.81	1.41	3.40
15	37.25	1.34	35.91
	<u>100.00</u>	<u>100.00</u>	<u>141.74</u>

The Index of Concentration is $141.74/2 = 70.87$

TABLE 8 - COMPONENTS OF THE INDEX OF CONCENTRATION, ALBERTA,
1961.

<u>Ethnic Group: Other European</u>			
Census Division	Y_i Per cent Area	X_i Per cent Population	$ X_i - Y_i $
1	3.25	2.58	0.67
2	2.81	12.88	10.07
3	1.93	1.40	0.53
4	3.41	0.64	2.77
5	2.60	2.58	0.02
6	2.00	23.68	21.68
7	3.05	1.95	1.10
8	2.27	5.07	2.80
9	7.14	3.17	3.97
10	3.28	4.44	1.16
11	2.24	30.58	28.34
12	20.19	2.14	18.05
13	3.77	3.18	0.59
14	4.81	1.53	3.28
15	37.25	4.18	33.07
	<u>100.00</u>	<u>100.00</u>	<u>128.10</u>

The Index of Concentration is $128.10/2 = 64.05$

TABLE 9 - COMPONENTS OF THE INDEX OF CONCENTRATION, ALBERTA,
1961.

Ethnic Group: Asiatic			
Census Division	Y_i Per cent Area	X_i Per cent Population	$ X_i - Y_i $
1	3.25	2.48	0.77
2	2.81	26.13	23.32
3	1.93	1.74	0.19
4	3.41	0.77	2.64
5	2.60	1.86	0.74
6	2.00	27.09	25.09
7	3.05	0.98	2.07
8	2.27	3.24	0.97
9	7.14	1.66	5.48
10	3.28	1.62	1.66
11	2.24	25.81	23.57
12	20.19	2.80	17.39
13	3.77	0.85	2.92
14	4.81	0.71	4.10
15	37.25	2.26	34.99
	<u>100.00</u>	<u>100.00</u>	<u>145.90</u>

The Index of Concentration is $145.90/2 = 72.95$

TABLE 10 - COMPONENTS OF THE INDEX OF CONCENTRATION, ALBERTA,
1961 .

<u>Ethnic Group: Indian and Eskimo</u>			
Census Division	Y_i Per cent Area	X_i Per cent Population	$ X_i - Y_i $
1	3.25	0.17	3.08
2	2.81	2.33	0.48
3	1.93	13.28	11.35
4	3.41	0.14	3.27
5	2.60	5.42	2.82
6	2.00	3.42	1.42
7	3.05	0.12	2.93
8	2.27	5.12	2.85
9	7.14	4.84	2.30
10	3.28	0.48	2.80
11	2.24	12.95	10.71
12	20.19	19.40	0.79
13	3.77	3.70	0.07
14	4.81	0.75	4.06
15	37.25	27.88	9.37
	<u>100.00</u>	<u>100.00</u>	<u>58.30</u>

The Index of Concentration is $58.30/2 = 29.15$

TABLE 1.1 - COMPONENTS OF THE INDEX OF CONCENTRATION, ALBERTA,
1961.

<u>Ethnic Group: Others</u>			
Census Division	Per cent Y_1 Area	Per cent X_1 Population	$ X_1 - Y_1 $
1	3.25	3.82	0.57
2	2.81	5.92	3.11
3	1.93	0.70	1.23
4	3.41	0.33	3.08
5	2.60	1.25	1.35
6	2.00	32.57	30.57
7	3.05	1.17	1.88
8	2.27	4.23	1.96
9	7.14	1.57	5.57
10	3.28	2.41	0.87
11	2.24	36.78	34.54
12	20.19	2.51	17.68
13	3.77	2.78	0.99
14	4.81	1.32	3.49
15	37.25	2.64	34.61
	<u>100.00</u>	<u>100.00</u>	<u>141.50</u>

The Index of Concentration is $141.50/2 = 70.75$

TABLE 12 - COMPONENTS OF THE INDEX OF AREAL SEGREGATION, ALBERTA,
1961.

<u>Ethnic Group: British Isles</u>				
Census Division	X_i Percent Pop.	P_i Percent tot. Population	X_i/P_i ratio	Deviation from 1.00
1	2.35	2.93	0.80	0.20
2	5.45	6.26	0.87	0.13
3	2.52	2.32	1.09	0.09
4	1.17	1.13	1.03	0.03
5	2.94	2.86	1.03	0.03
6	30.36	23.83	1.28	0.28
7	3.32	3.06	1.08	0.08
8	6.96	5.74	1.21	0.21
9	1.47	1.52	0.97	0.03
10	3.64	5.26	0.69	0.31
11	30.06	30.92	0.97	0.03
12	1.65	3.55	0.47	0.53
13	2.39	3.41	0.70	0.30
14	1.30	1.45	0.90	0.10
15	4.42	5.76	0.77	0.23
	<u>100.00</u>	<u>100.00</u>		<u>2.38</u>

The Index of Areal Segregation is $2.38/15 = 0.16$

TABLE 13 - COMPONENTS OF THE INDEX OF AREAL SEGREGATION, ALBERTA,
1961.

<u>Ethnic Group: German</u>				
Census Division	X_1 Percent Pop.	P_1 Percent tot. Population	X_1/P_1 ratio	Deviation from 1.00
1	7.64	2.93	2.61	1.61
2	7.00	6.26	1.12	0.12
3	2.04	2.32	0.88	0.12
4	1.94	1.13	1.72	0.72
5	3.47	2.86	1.21	0.21
6	20.50	23.83	0.86	0.14
7	4.47	3.06	1.46	0.46
8	5.13	5.74	0.89	0.11
9	0.82	1.52	0.53	0.47
10	4.23	5.26	0.80	0.20
11	31.60	30.92	1.02	0.02
12	1.10	3.55	0.31	0.69
13	4.16	3.41	1.22	0.22
14	1.54	1.45	1.06	0.06
15	4.36	5.76	0.76	0.24
	<u>100.00</u>	<u>100.00</u>		<u>5.39</u>

The Index of Areal Segregation is $5.39/15 = 0.36$

TABLE 14 - COMPONENTS OF THE INDEX OF AREAL SEGREGATION, ALBERTA,
1961.

<u>Ethnic Group: French</u>				
Census Division	X_i Percent Pop.	P_i Percent tot. Population	X_i/P_i ratio	Deviation from 1.00
1	1.14	2.93	0.39	0.61
2	2.28	6.26	0.36	0.64
3	1.38	2.32	0.59	0.41
4	0.48	1.13	0.42	0.58
5	1.67	2.86	0.58	0.42
6	14.95	23.83	0.63	0.37
7	2.25	3.06	0.74	0.26
8	3.42	5.74	0.60	0.40
9	0.95	1.52	0.63	0.37
10	2.38	5.26	0.45	0.55
11	34.60	30.92	1.12	0.12
12	14.00	3.55	3.95	2.95
13	4.55	3.41	1.34	0.34
14	2.05	1.45	1.41	0.41
15	13.90	5.76	2.42	1.42
	<u>100.00</u>	<u>100.00</u>		<u>9.85</u>

The Index of Areal Segregation is $9.85/15 = 0.66$

TABLE 15 - COMPONENTS OF THE INDEX OF AREAL SEGREGATION, ALBERTA,
1961.

<u>Ethnic Group: Slavonic</u>				
Census Division	X_i Percent Pop.	P_i Percent tot. Population	X_i/P_i ratio	Deviation from 1.00
1	1.94	2.93	0.66	0.34
2	3.60	6.26	0.58	0.42
3	0.91	2.32	0.39	0.61
4	1.00	1.13	0.88	0.12
5	1.51	2.86	0.53	0.47
6	11.98	23.83	0.50	0.50
7	1.51	3.06	0.49	0.51
8	2.12	5.74	0.37	0.63
9	1.22	1.52	0.80	0.20
10	14.98	5.26	2.85	1.85
11	38.15	30.92	1.23	0.23
12	7.91	3.55	2.23	1.23
13	6.61	3.41	1.94	0.94
14	1.50	1.45	1.03	0.03
15	5.06	5.76	0.88	0.12
	<u>100.00</u>	<u>100.00</u>		<u>8.20</u>

The Index of Areal Segregation is $8.20/15 = 0.55$

TABLE 16 - COMPONENTS OF THE INDEX OF AREAL SEGREGATION, ALBERTA,
1961.

Ethnic Group: Scandinavian				
Census Division	X_1 Percent Pop.	P_1 Percent tot. Population	X_1/P_1 ratio	Deviation from 1.00
1	2.40	2.93	0.82	0.18
2	6.86	6.26	1.10	0.10
3	2.94	2.32	1.27	0.27
4	1.57	1.13	1.39	0.39
5	3.95	2.86	1.38	0.38
6	20.01	23.83	0.84	0.16
7	5.39	3.06	1.76	0.76
8	8.59	5.74	1.50	0.50
9	1.04	1.52	0.68	0.32
10	8.95	5.26	1.70	0.70
11	24.83	30.92	0.80	0.20
12	2.06	3.55	0.58	0.42
13	3.02	3.41	0.89	0.11
14	1.72	1.45	1.19	0.19
15	6.67	5.76	1.16	0.16
	<u>100.00</u>	<u>100.00</u>		<u>4.84</u>

The Index of Areal Segregation is $4.84/15 = 0.32$

TABLE 17 - COMPONENTS OF THE INDEX OF AREAL SEGREGATION, ALBERTA,
1961.

<u>Ethnic Group: Dutch</u>				
Census Division	X_1 Percent Pop.	P_1 Percent tot. Population	X_1/P_1 ratio	Deviation from 1.00
1	2.39	2.93	0.82	0.18
2	12.85	6.26	2.05	1.05
3	2.16	2.32	0.93	0.07
4	0.62	1.13	0.55	0.45
5	3.60	2.86	1.26	0.26
6	23.44	23.83	0.98	0.02
7	2.08	3.06	0.68	0.32
8	6.96	5.74	1.21	0.21
9	0.85	1.52	0.56	0.44
10	2.47	5.26	0.47	0.53
11	29.20	30.92	0.95	0.05
12	0.81	3.55	0.23	0.77
13	2.84	3.41	0.83	0.17
14	1.63	1.45	1.12	0.12
15	8.10	5.76	1.41	0.41
	<u>100.00</u>	<u>100.00</u>		<u>5.05</u>

The Index of Areal Segregation is $5.05/15 = 0.34$

TABLE 18 - COMPONENTS OF THE INDEX OF AREAL SEGREGATION, ALBERTA,
1961.

<u>Ethnic Group: Italian</u>				
Census Division	X_i Percent Pop.	P_i Percent tot. Population	X_i/P_i ratio	Deviation from 1.00
1	1.93	2.93	0.66	0.34
2	9.24	6.26	1.48	0.48
3	1.17	2.32	0.50	0.50
4	0.08	1.13	0.07	0.93
5	2.77	2.86	0.97	0.03
6	34.18	23.83	1.43	0.43
7	0.56	3.06	0.18	0.82
8	2.23	5.74	0.39	0.61
9	8.90	1.52	5.85	4.85
10	0.41	5.26	0.08	0.92
11	32.57	30.92	1.05	0.05
12	1.87	3.55	0.53	0.47
13	1.34	3.41	0.39	0.61
14	1.41	1.45	0.97	0.03
15	1.34	5.76	0.23	0.77
	<u>100.00</u>	<u>100.00</u>		<u>11.84</u>

The Index of Areal Segregation is $11.84/15 = 0.79$

TABLE 19 - COMPONENTS OF THE INDEX OF AREAL SEGREGATION, ALBERTA,
1961.

<u>Ethnic Group: Other European</u>				
Census Division	X_i Percent Pop.	P_i Percent tot. Population	X_i/P_i ratio	Deviation from 1.00
1	2.58	2.93	0.88	0.12
2	12.88	6.26	2.06	1.06
3	1.40	2.32	0.60	0.40
4	0.64	1.13	0.57	0.43
5	2.58	2.86	0.90	0.10
6	23.68	23.83	0.99	0.01
7	1.95	3.06	0.64	0.36
8	5.07	5.74	0.88	0.12
9	3.17	1.52	2.08	1.08
10	4.44	5.26	0.84	0.16
11	30.58	30.92	0.99	0.01
12	2.14	3.55	0.60	0.40
13	3.18	3.41	0.93	0.07
14	1.53	1.45	1.06	0.06
15	4.18	5.76	0.73	0.27
	<u>100.00</u>	<u>100.00</u>		<u>4.65</u>

The Index of Areal Segregation is $4.65/15 = 0.31$

TABLE 20 - COMPONENTS OF THE INDEX OF AREAL SEGREGATION, ALBERTA,
1961.

<u>Ethnic Group: Asiatic</u>				
Census Division	X_i Percent Pop.	P_i Percent tot. Population	X_i/P_i ratio	Deviation from 1.00
1	2.48	2.93	0.85	0.15
2	26.13	6.26	4.17	3.17
3	1.74	2.32	0.75	0.25
4	0.77	1.13	0.68	0.32
5	1.86	2.86	0.65	0.35
6	27.09	23.83	1.14	0.14
7	0.98	3.06	0.32	0.68
8	3.24	5.74	0.56	0.44
9	1.66	1.52	1.09	0.09
10	1.62	5.26	0.31	0.69
11	25.81	30.92	0.84	0.16
12	2.80	3.55	0.79	0.21
13	0.85	3.41	0.25	0.75
14	0.71	1.45	0.49	0.51
15	2.26	5.76	0.39	0.61
	<u>100.00</u>	<u>100.00</u>		<u>8.52</u>

The Index of Areal Segregation is $8.52/15 = 0.57$

TABLE 21 - COMPONENTS OF THE INDEX OF AREAL SEGREGATION, ALBERTA,
1961.

<u>Ethnic Group: Indian and Eskimo</u>				
Census Division	X_i Percent Pop.	P_i Percent tot. Population	X_i/P_i ratio	Deviation from 1.00
1	0.17	2.93	0.40	0.60
2	2.33	6.26	0.37	0.63
3	13.28	2.32	5.72	4.72
4	0.14	1.13	0.12	0.88
5	5.42	2.86	1.90	0.90
6	3.42	23.83	0.14	0.86
7	0.12	3.06	0.04	0.96
8	5.12	5.74	0.89	0.11
9	4.84	1.52	3.18	2.18
10	0.48	5.26	0.09	0.91
11	12.95	30.92	0.42	0.58
12	19.40	3.55	5.47	4.47
13	3.70	3.41	1.08	0.08
14	0.75	1.45	0.52	0.48
15	27.88	5.76	4.84	3.84
	100.00	100.00		22.20

The Index of Areal Segregation is $22.20/15 = 1.48$

TABLE 22 - COMPONENTS OF THE INDEX OF AREAL SEGREGATION, ALBERTA,
1961.

<u>Ethnic Group: Other</u>				
Census Division	X_i Percent Pop.	P_i Percent tot. Population	X_i/P_i ratio	Deviation from 1.00
1	3.82	2.93	1.30	0.30
2	5.92	6.26	0.95	0.05
3	0.70	2.32	0.30	0.70
4	0.33	1.13	0.29	0.71
5	1.25	2.86	0.44	0.56
6	32.57	23.83	1.36	0.36
7	1.17	3.06	0.38	0.62
8	4.23	5.74	0.74	0.26
9	1.57	1.52	1.03	0.03
10	2.41	5.26	0.46	0.54
11	36.78	30.92	1.19	0.19
12	2.51	3.55	0.71	0.29
13	2.78	3.41	0.82	0.18
14	1.32	1.45	0.91	0.09
15	2.64	5.76	0.46	0.54
	<u>100.00</u>	<u>100.00</u>		<u>5.43</u>

The Index of Areal Segregation is $5.43/15 = 0.36$

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